

第一章 专业英语基础

第一节 引言

由于 20 世纪科学技术的飞速发展，各国技术情报资料大量涌现，国际上学术交流日益频繁。据统计，目前用各种语言出版的专业科技期刊约四万多种，并且还在以每年一千多种的速度增加。我国近年来也主持召开了大量的国际性学术会议，并出版了一定数量的英文专业杂志。由于历史的原因，目前国际上科技情报资料的交流主要是使用英语。对于计算机、自动控制、电子类专业而言，85% 以上的专业科技资料都是以英文形式出现的。因此，专业英语 (English for Special Science and Technology) 的学习，对于科技人员吸收最新技术情报，参与国际科学技术交流是非常重要的。

科学技术本身的性质要求专业英语与专业内容相互配合，相互一致，这就决定了专业英语与普通英语 (Common English or General English or Ordinary English) 有很大的差异。专业英语的主要特点是它具有很强的专业性，懂专业的人用起它来得心应手，不懂专业的人用起来则困难重重。由于各个领域的专业英语都是以表达科技概念、理论和事实为主要目的，因此，它们必然存在许多共同的特点。与普通英语相比，专业英语很注重客观事实和真理，并且要求逻辑性强，条理规范，表达准确、精练、正式。专业英语有如下显著特点：

- 长句多
- 被动语态使用频繁
- 用虚拟语气表达假设或建议
- 在说明书、手册中广泛使用祈使语句
- 名词性词组多
- 非限定动词 (尤其是分词) 使用频率高
- 介词短语多
- 常用 It... 句型结构
- 单个动词比动词词组用得频繁
- 常使用动词或名词演化成的形容词
- 希腊词根和拉丁词根比例大
- 专业术语多
- 缩略词经常出现
- 半技术词汇多
- 缩写使用频繁
- 插图、插画、表格、公式、数字所占比例大
- 合成新词多

本章将扼要地介绍专业英语的语法特点、专业英语的词汇特点，以及专业英语各种文体

中常用符号、公式等。至于专业英语各种文体的特点将在后面各章中详细予以介绍。

第二节 专业英语的语法特点

由于科学技术关心的不是个人的心理情绪，而是客观的普遍规律和对过程、概念的描述，因此专业英语应具有的客观性及无人称性 (Objectivity and impersonality) 必然要反映到语法结构上来。

专业英语的语法特点可归纳为客观 (objectivity), 精练 (conciseness) 和准确 (accuracy)。

一、客观

因为要求客观，所以常用被动语态和一般现在时。有人统计专业英语中被动语态的句子要占 $1/3 \sim 1/2$ 。即使用主动语态，主语也常常是非动物的 (inanimate subject)。

例

The vacuum technique is now being improved. Now let's study a tetrode. A new electrode can be mounted between grid and plate. And the capacitance between grid and plate can be made small. This electrode is called the screen. This tube is known as tetrode. The screen is mounted between the grid and the plate. It acts as an electrostatic shield between them and the grid-to-plate capacitance may be reduced. A by-pass capacitor is joined between the screen and the cathode. The effectiveness of this shielding action is increased. By means of the screen and this by-pass capacitor, the grid-to-plate capacitance of a tetrode is made very small. The screen is operated at a positive voltage and attracts electrons from the cathode. But because of the larger space between wires of the screen, most of the electrons are attracted to the screen and pass through it to the plate.

Notes 注 释

- | | |
|-------------------|------------|
| (1) tetrode n. | 四极管 |
| (2) mount vt. | 安、架、安装 |
| (3) grid n. | 栅极，网 |
| (4) plate n. | 屏极，阳极，板极，片 |
| (5) screen n. | 栅极，屏蔽，荧光屏 |
| (6) shield vt. n. | 屏蔽，保护物 |
| (7) by-pass n. | 旁路 |
| (8) Cathode n. | 阴极 |

在上述 13 句的短文中，有 12 句都使用了被动语态。专业科技人员之所以如此频繁地使用被动语态，一方面是由于被动语态句子比主动语态更短更简明，另一方面是因为它允许将最重要的信息放在句首，使之下就抓住读者的注意力。更重要的是科技人员通常更关心的是事实和行为，而不是行为者。以上面第一句为例，它并未指出是谁在改进真空技术。是作者、读者、还是所有科技人员，这些都无关紧要，采用被动语态就可避免这种不必要的考证或混乱。

正是由于这些原因，被动语态广泛地应用于表述规则、原理、过程、技术报告和说明书等等。

就时态而言，因为专业科技文献所涉及的内容（如科学定义、定理、方程式或公式、图表等）一般并没有特定的时间关系，所以在专业文献中大部分都使用一般现在时。上面的短文中就几乎都使用了一般现在时。至于一般过去时、一般完成时也在专业英语中经常出现，如科技报告、科技新闻、科技史料等。其他时态，如过去将来时、完成进行时等，在专业英语中很少出现。

二、精练

因为要求精练，专业英语中常希望用尽可能少的单词来清晰地表达原意。这就导致了非限定动词、名词化单词或词组及其他简化形式的广泛使用。

（一）动名词的运用

动名词短语可用来取代时间从句或简化时间陈述句。

例

通常的表达形式为：

- (1) Before it is amplified, the signal should be detected.
- (2) When we remove the impurities, the water can be passed back to the boiler
- (3) Switch off the main supply. Remove the fuse.

相应的精练表达形式为：

- (1) Before being amplified, the signal should be detected.
- (2) On removing the impurities, the water can be passed back to the boiler.
- (3) Before removing the fuses, switch off the main supply.

（二）分词的运用

过去分词短语可以取代被动态关系从句，现在分词可以取代主动态关系从句。

例

通常的表达形式为：

- (1) In Britain electrical energy which is generated in power station is fed to the national Grid.

- | | | | |
|----------|---|----------|--------------|
| (2) When | } | it is | inverted ... |
| While | | | |
| Once | | | |
| If | | | |
| Unless | | | |
| Though | | | |
| | | was | |
| | | has been | |

- (3) As was mentioned ...
- (4) The plane which is flying at ...

相应的精练表示形式为：

- (1) In Britain electrical energy generated in power station is fed to the National Grid.

- | | | |
|----------|---|--------------|
| (2) When | } | inverted ... |
| While | | |
| Once | | |
| If | | |
| Unless | | |
| Though | | |

(3) As mentioned above ...

(4) The plane flying at ...

(三) 不定式的运用

不定式短语常用以替换表示目的, 功能的从句。

例

通常的表达形式为:

(1) We keep micrometers in boxes. Our object in doing this is to protect them from rust and dust.

(2) What does a fuse do? It protects a circuit.

相应的精练表示形式为:

(1) We keep micrometers in boxes to protect them from rust and dust.

(2) The function of a fuse is to protect a circuit.

(四) 其他简化形式

通常的表达形式为:

(1) It is necessary to examine whether the new design is efficient.

(2) It is doubtful how accurate the results are.

(3) A telephone dial consists of a rotatable plate which has ten finger holes in it.

(4) If it is possible, ...

(5) As mentioned before, ...

精练的表示为:

(1) It is necessary to examine the efficiency of the new design.

(2) The accuracy of these results is doubtful.

(3) A telephone dial consists of a rotatable plate with ten finger holes in it.

(4) If possible, ...

(5) As before, ...

三、准确

专业英语的准确性主要表现在用词上, 这在下一节将详细讨论, 然而在语法结构上也有其特点。例如, 为了准确精细地描述事物过程, 所用句子都较长, 有些甚至一段就是一个句子。长句反映了客观事物中复杂的关系, 它与前述精练的要求并不矛盾, 句子长结构仍是精练的, 只是包含的信息量大, 准确性较高。下面一段描述计算机分时系统的短文可以充分说明这个特点。

A very brief conceptual introduction to time sharing is not an easy task because the term has already become so generalized that it has a great variety of

meanings to scores of interesting groups and wide ranges of intelligence levels in such groups. It might best be developed by listing its logical components: simultaneity—a variable number of people can use the computer at essentially the same time; independence—the programs being handled by the system are operated independently of one another without risk of being intermixed or having security breached; immediacy—all requests for computer response receive that response within seconds (or less) of the completion of the required computation and most often before “action deadlines” occur; spatial unlimitability—missiles millions of miles away have operated in real-time; and, earth-bound time-sharing users can communicate with the computer by means of teletype, visual displays (cathode-ray tubes) and scores of other input/output devices which are not generally in close proximity to the central computer, and can be continents away. Time sharing is really the utilization of time.

Notes 注 释

- | | | | |
|---------------------|-------|--------------------|--------|
| (1) Simultaneity n. | 同时性 | (5) spatial a. | 空间的 |
| (2) breach vt. | 违反、破坏 | (6) earth-bound a. | 只在地球上的 |
| (3) immediacy n. | 即时性 | (7) teletype n. | 电传打字机 |
| (4) deadline n. | 最后期限 | (8) proximity n. | 接近、近似 |

参 考 译 文

要对分时的概念作一个简明的介绍不是件容易的事情，因为这个术语已经变得非常笼统，以致对于成百个专业团体以及这些团体里智力水平高低不一的人来说，它具有各种各样的意义。最好还是通过列举这个术语的逻辑成分来加以阐明：同时性——不同数目的人能在基本相同的时间内使用计算机；独立性——系统正在处理的程序可以彼此独立地操作，而没有互相混合或破坏安全的危险；即时性——所有要计算机回答的要求在完成所需的计算的几秒钟（或更少）时间内都可得到回答，而且多半是在发生“作用期限”之前就能得到；空间无限性——几百万英里以外的导弹一直是在实时内运行的；此外，地球上的分时用户能使用一般不在中央机附近而可能远在几大洲之外的电传打字机、可见显示装置（阴极射线管）和成百个其他输入/输出装置。分时确实确实是充分利用时间。

专业英语的语法特点除上述外，还有许多其他特点，如通格名词作前置定语的现象相当普遍，虚拟语气使用频繁，分裂定语或定语从句较多，后置定语特多以及名词或名词短语直接作状语的现象较普遍等等，它们都可归结为客观、精练及准确要求的结果。这里不再一一详述。

第三节 专业英语的词汇特点

词汇是语言发展的产物。语言在发展过程中，旧的词不断被抛弃，新的词不断在产生。随着科学技术的发展，新术语、新概念、新理论和新产品不断出现。不但新词（如词组）大

量涌现，许多日常用语也不断增加新的科技含义，如 **off-the-shelf** (成品的) **state-of-art** (现代化设备) 等。在专业英语中，缩略语的增加尤为迅速，各类技术词汇也随着专业的细分、学科的渗透而日益增多。

一、词汇构成

(一) 技术词汇 (technical words)

这类词的意义狭窄、单一，一般只使用在各自的专业范围内，因而专业性很强。这类词一般较长并且越长词义越狭窄，出现的频率也不高。

例

bandwidth (带宽)	flip-flop (触发器)
superconductivity (超导性)	quadraphonics (四声道立体声)
hexadecimal (十六进制)	superheterodyne (超外差式)
amplifier (放大器)	phenanthrahydroquinone (菲尔酚)

(二) 次技术词汇 (sub-technical words)

次技术词是指不受上下文限制的各专业中出现频率都很高的词。这类词往往在不同的专业中具有不同的含义。

例

work, load, plant, field, reaction, energy, power, force, conductor, solution, revolution, operation, register, efficiency, system

其中，**reaction** 在日常生活中表示某人对某件事的反应，在化学中表示两种物质分子间的化学反应，在核物理中表示原子核的链式反应，在土木工程中又可表示反作用力等等；**conductor** 在日常生活中可表示售票员和乐队指挥，在电学中却表示导体；**register** 在计算中表示寄存器，在电学中表示计数器、记录器，在乐器中表示音区，而在日常生活中则表示登记簿、名册、挂号信等。

(三) 特用词 (big words)

在日常英语中，为使语言生动活泼，常使用一些短小的词或词组。而在专业英语中，表达同样的意义时，为了准确、正式、严谨，不引起歧义却往往选用一些较长的特用词。这些词在非专业英语中极少使用但却属于非专业英语。

日常英语中常用下列句子：

Then the light is turned on.

在专业英语中，却表示为：

The circuit is then completed.

这是由于 **complete** 词义单一准确，可以避免歧义。而 **turned on** 不仅表示开通，而且还可以表示其他意义，如：

The success of a picnic usually turns on (依赖) the weather.

The dog turned on (袭击) to me and bit me in the leg.

又如下句中不用 **send** 和 **change**，而用 **transmit** 和 **convert**，其道理是一样的。

The coaxial cables transmit the modulated I. F. carriers to the equipment on

the aerial where they are converted into their assigned frequencies in the GHz band.

类似的词还有：

go down—depress

turn upside down—invert

keep—maintain

enough—sufficient

take away—remove

at once—immediately

push in—insert

a lot of—appreciable

used up—consume

find out—determine

(四) 功能词 (function words)

它包括介词、连词、冠词、代词等。功能词为词在句子中的结构关系提供了十分重要的结构信号，对于理解专业内容十分重要，而且出现频率极高。研究表明，在专业英语中，出现频率最高的十个词都是功能词，其顺序为：the, of, in, and, to, is, that, for, are, be。比如，下例中 14 个词中功能词就占了 6 个。

例

When the recorder is operated in the record mode, previous recordings are automatically erased.

二、构词法 (word building)

专业英语的构词有如下两个显著特点：

第一，大部分专业词汇来自希腊语和拉丁语；

第二，前缀和后缀的出现频率非常高。

希腊语和拉丁语是现代专业科技英语词汇的基础。根据美国专家 Oscar E. Nybaken 的统计结果，在 10 000 个普通词汇中大约有 46% 的词汇源于拉丁语，7.2% 的词汇源于希腊语，对于专业性强的词汇，这个比例更高。

英语构词法有下述三种。

(一) 合成 (composition) 如：

work + shop → workshop,

feed + back → feedback,

in + put → input,

forward + bias → forward—bias

合成方法有：名词 + 名词，形容词 + 名词，动词 + 副词，名词 + 动词，介词 + 名词，形容词 + 动词等等。

(二) 转换 (conversion) 如：

and → to and, use → to use, increase → to increase,

extent → to extend。

转换时词形一般不变（有时发生重音或尾音的变化），只是词类转用。

(三) 派生或词缀 (derivation)

专业英语词汇大部分都是用派生法构成的，即通过对词根加上各种前缀和后缀来构成新词。以 1978 年清华大学编写的《英汉技术词典》为例，以 semi- 构成的词有 230 个以上，以 auto- 构成的词有 260 个以上，以 micro- 构成的词有 300 个以上，以 thermo- 构成的词有 130 个。仅这四个前缀构成的词就达近千个，而常用的前缀和后缀却多达上百个，可见派生法的构词能力是非常强的。作为一个专业科技人员，至少应掌握 50 个常用前缀和后缀。

下面是必须掌握的一些常用前缀和后缀。

1. 名词词缀

表 1.1

名 词 词 缀

词	缀	词	例
inter-	(between, among)	intersection, interface	
counter-	(against)	countershaft, counterpart	
sub-	(beneath, less than)	subway, submarine	
in-		intake, inlet	
out-		outlet, output	
through-		throughput	
hyper-	(over)	hyperon, hyperplane	
di-	(two)	diode	
tri-	(three)	triangle	
tele-	(far away)	telescope	
photo-	(light)	photosphere	
micro-	(small)	microwave, microcomputer	
ultra-	(excessively)	ultra-high-frequency	
super-	(to an unusually high degree)	superheated	
holo-	(completely by oneself)	holograph	
-ics	(subject)	dynamics, statistics	
-logy	(subject)	anthropology	
-cle	(diminutive, small)	particle	
-ism	(an action)	mechanism	
-ist		scientist, artist	
-scope	(see, observe)	microscope, telescope	
phone	(sound)	microphone	

2. 形容词词缀

表 1.2

形 容 词 词 缀

词	缀	词	例
in-	(not)	inadequate, insufficient	
im-	(not)	incompatible, impossible	
ir-	(not)	irrational, irresponsible	
un-	(not)	unchanged, unstable	
super-	(above, more than)	superficial, supersonic	
-able, -ible		noticeable, negligible	
-ive		reactive, effective	
-ent, -ant		convergent, sufficient	
-ing, -ed		cutting, compressed	
-al		structural, critical	
-ar		circular, linear	
-ic		electronic, metallic	
-ous		synchronous, porous	
-proof		fireproof, acid-proof	

3. 动词词缀

表 1.3

动 词 词 缀

词 缀	词 例
re- (again)	reuse, recharge
over- (too much)	overwork, overload
under- (too little)	under-load, underpay
dis- (the opposite)	disconnect, discharge
de- (cause not to be)	demagnetise, defreeze
ab- (being away from)	abstract
con- (together)	confound
ex- (out)	exit
ob- (against)	obstruct
trans- (across)	transform
-en (get, make, become)	weaken, harden, shorten
-fy (make)	electrify, purify
-ise	normalise, energise
-ate	integrate, accelerate

三、词汇缩略

(一) 节略词 Clipped words)

某些词汇在发展过程中为方便起见逐渐用它们的前几个字母来表示，这就是节略词。

例

maths—mathematics

ad —advertisement

lab —laboratory

kilo—kilogram

uni—uniform, university

metro—metrology

dir —directory

del —delete

(二) 缩略词 (Acronyms)

缩略词是指由某些词组的首字母所组成的新词。

例

radar —radio detecting and ranging

laser —light amplification by stimulated emission of radiation

ROM —Read Only Memory

RAM —Random Access Memory

UNESCO—United Nations Educational, Scientific and Cultural Organization

(三) 首字词 Initials)

首字词与缩略词基本相同，区别在于首字词必须逐字母念出。

例

CAD—Computer Aided Design
 APC—Automatic Phase Control
 CPU—Central Process Unit
 SCR—Silicon Controlled Rectifier
 ADC—Analog to Digital Conversion
 bps—bit per second
 IC—Integrated Circuit
 IBM—International Business Machine (Corporation)

(四) 缩写词 (Abbreviation)

缩写词并不一定由某个词组的首字母组成,有些缩写词仅由一个单词变化而来,而且大多数缩写词每个字母后都附有一个句点。专业英语中的缩写词数量很大,约 20 000~30 000 个,有些缩写词长达九个字母。此外,由于科学技术不断发展,各个学科的新术语不断出现,这就使得缩写词也具有一词多义,因而在阅读时应引起重视。

例

N. B. (Latin)—Note Carefully	
et al. —and other	vs. —versus
Appx.—Appendix	A.C.—Alternating Current, Aerodynamic Centre
Fig. —Figure	O.P.—Operational Amplifier
sq. —square	Msg.—Message
e. g. —for example	Ltd. —limited
Amp.—Amplifier	I.O.—Input Output
cf. —compare	ff. —following
etc. —and so forth	

第四节 符号、公式及其他

一、特殊符号

表 1.4 特 殊 符 号

符号	意 义	符号	意 义
∴	because	¥	yuan
∴	therefore	@, ?	print
≧	is not greater than	μP	microprocessor
≦	is not less than	μC	microcomputer
→	result in, lead to	"	inches, seconds
↗	doesn't result in	//	is parallel to
≫	is much greater than	⊥	is perpendicular to
≪	is much less than	°	degree
&	and	∫∫	double integral
≡	is equivalent to	∫∫∫	triple integral
~	is similar to	#	number
£	pound	\$	dollar

二、常用希腊字母

α alpha	η eta	τ tau
β beta	θ theta	ϕ, φ phi
γ gamma	μ mu	ψ psi
δ delta	π pi	ω omega
ϵ epsilon	$\Sigma \sigma$ sigma	λ lambda

三、分数、小数及百分比

1/2	a (one) half	0.2 0 (nought, zero) point two
1/3	a (one) third	0.0032 0 point 0 0 three two
1/4	a (one) quarter	63.57 sixty-three point five seven
1/9	a (one) ninth	52%, 52pc fifty-two per cent
2/3	two-third	3‰ three per mil (thousand)
5/16	five-sixteenths	$2\frac{1}{2}$ two and a half

四、符号与方程

$a + b$	a and (plus) b
$a - b$	a minus b
$a \times b$	a times (multiplied by) b
a / b	a over (divided by) b
$a = b$	a equals (is equal to) b
$a \neq b$	a is not (is not equal to) b
$a \approx b$	a approximately equals b
$a > b$	a is greater than b
$a \leq b$	a is less than or equal to b
$x \rightarrow \infty$	x approaches infinity
$a \equiv b$	a is equivalent to b
$a \propto b$	a is proportional to b
$a : b$	a to b
90°	ninety degrees
90°C	ninety degrees Centigrated
90°F	ninety degrees Fahrenheit
x^2	x square (squared)
y^3	y cube (cubed)
z^{-10}	z to the minus tenth power
$\sqrt{4}$	the square root of four
$\sqrt[3]{a}$	the cube root of a

$\sqrt[5]{a^2}$ the fifth root of a square
 a' a prime
 a'' a double (second, twice) prime
 a_1 a sub one
 f'_c f prime, sub c
 dx differential x
 dz/dx first derivative of z with respect to x
 $y=f(x)$ y is a function of x
 $\partial y/\partial u$ the partial derivative of y with respect to u
 $\sin^{-1}x$ antisine
 $\sinh, sh$ hyperbolic sin
 $\log_a b$ logarithm b to the base a
 $E = \frac{p/a}{e/1} = \frac{pl}{ac}$ big E is equal to the ratio of p divided by a to e divided by 1, is equal to the ratio of the product p l to the product a e
 $\int_n^m$ integral of ... from n to m
 $\int \frac{dy}{\sqrt{c^2 - y^2}}$ the integral of dy over (by) the square root out of c square minus y square
 $M = R_1 x - P_1(x - a_1)$ M is equal to R sub one multiplied by x minus P sub one, round brackets opened x minus a sub one, round brackets closed
 $b = \frac{1}{2} p \cdot \sec \frac{1}{2} \beta$ b equals half p secant half beta
 $R = \sqrt{(\Sigma Px)^2 + (\Sigma Py)^2}$ R equals the square root of sigma P x all squared, plus sigma P y all squared
 $1 \text{ rad} = \frac{180^\circ}{\pi} \approx 57.3^\circ$ one radian equals one eight degrees divided by pi, which is approximately equal to fifty-seven point three degrees

习 题

1. 将下列主动句变为被动句
 - (1) A German scientist discovered electromagnetic waves.
 - (2) On the TV screen people could see the skylab orbiting round the earth in outer space.
 - (3) After people generate the power at 11,000 volts, they send it into transformers that step-up the voltage 25 times to 275,000 volts.
 - (4) A few years ago people thought it unusual that viewers could call up

programmes to be displayed on their TV screens at home.

(5) Wherever you look in a modern factory, you may find some electronic devices at work and operating with high efficiency.

2. 在下列短文的括号中换上合适的动词形式

Electronic digital computers (perform) arithmetic operations such as addition, subtraction, multiplication, and division on numbers at speeds of thousands of operations per second. Some of the very fast computer being (build) (attain) several millions of operations per second. Obviously, it (be) not practical to use a human operator to control which operation (be) to be performed next and to (supply) the numbers to the computer for each arithmetic operation, since the operator (require) several seconds to perform these tasks. Rather, a control system is used which (sequence) the operations in the computer; and fast input and output devices and internal storage (be) used to supply the computer with the numbers for the calculation.

3. 以动名词短语形式简化下列句子

(1) After you have used an electrical instrument, you should always make sure that it is switched off.

(2) Before the operator signs off, he repeats his call sign.

(3) When one touches an electrified metal object with the hand, the charge flows through one's body to the ground.

(4) When we push the button of an electric doorbell, the electric circuit will be closed.

(5) If the air is suddenly heated by lightning flashes, there will be thunder.

4. 以分词短语形式简化下列句子

(1) Generators which are not required for service now are kept in good care.

(2) The research which is being carried out in this subject is extensive and meaningful.

(3) The current flows through the conductor. A magnetic field is set up round the conductor.

(4) Electrons are particles. particles move round their atomic nucleus.

(5) Aluminium finds wide application in industry. It possesses high conductivity of heat and electricity.

5. 以不定式短语形式简化下列句子

(1) They thought that this computer was very good.

(2) The material that we are going to use is a good conductor.

(3) He opened the valve so that the current could flow.

(4) We want to improve the railway service. Therefore we are electrifying the main lines.

(5) We want to measure the resistance of a conductor. So it is necessary to have some fixed standard.

6. 以精练的形式重写下列句子 (提示: 利用名词、名词词组或 “with+名词” 短语)

(1) Transformers are widely used in transmitting electrical power.

(2) Experts from the company are trying to discover what has caused the accident.

(3) The progress of the work will depend on how modern the equipment is.

(4) The whole atom is electrically neutral, ..., The whole atom has an equal number of protons and electrons.

(5) This problem has to be solved if it is possible.

7. 阅读下列短文, 找出 5 个以上技术词汇及次技术词汇, 并说明次技术词汇在不同领域中的意义。

Cathode Ray Tube

The cathode ray tube (C. R. T.) is one of the most important of the electronic devices because it made television possible. In the C. R. T. a thin beam of electrons moving in an evacuated glass vessel is made to respond to changes in the electrical and magnetic fields imposed on it. The response of the electronic beam is instantaneous because its inertia is negligible. It is therefore very sensitive to any forces which act on it. When the beam of electrons strikes the front of the cathode ray tube it activates a phosphor—a material which converts electronic energy into the light which shows through the glass.

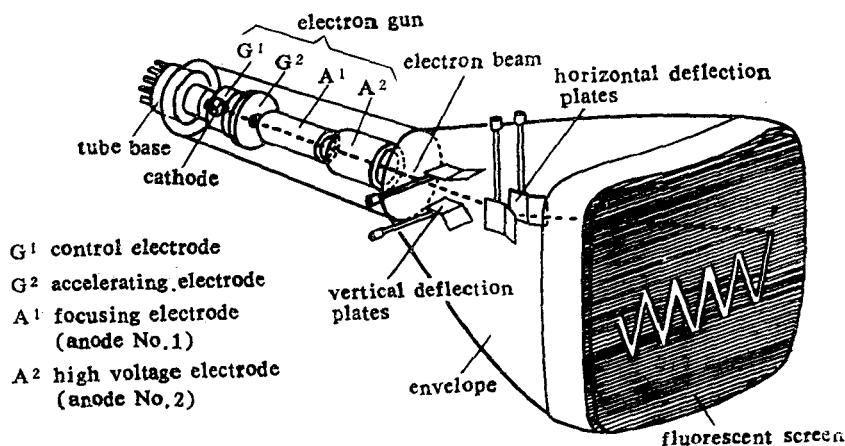


Fig.1 Cathode ray tube

8. 阅读下列短文, 指出其中有无合成词、转换词、派生词、节略词、缩略词、首字词和缩写词。

Computers in Business

Communication with the machine is the programmer's responsibility. Computer programming consists of producing detailed logical step-by-step instructions which are ultimately obeyed by the computer—'software' for the 'hardware'. Initially the programmer checks the detailed specifications supplied to him by the sys-

tems analyst and then produces an overall flow-chart for the run involved. It is advisable for him to check this and subsequent detailed flow-charts with the systems analysis to ensure that the required processing will be performed. After this the actual coding is undertaken. The programming language used will depend on the computer type and size, the frequency with which the job is likely to be run, its size, and the duration of each run. A language may range from the detailed 'lower level' very close to that immediately understood by the particular computer, to the high level (such as BASIC or FORTRAN) which can be rendered automatically acceptable to a wide range of computers.

Program tests of increasing stringency follow and when finally proved the run can be incorporated in the library of operational programs.

The first applications implemented are often clerical routines which involve a high volume of paperwork and little element of decision making. This is often a sound approach as it enables many levels of staff to become familiar with some features of computer usage. However, the major economic returns are usually in the second wave of applications which use the data then available in the computer-held files created and used by the initial applications. Computers can provide analyses of every operation in business and these analyses can reveal vital trends in every field from buying to marketing.

9. 写出下述式子的读法全称

(1) $xX + yY = 1$

(2) $y = Ax^2 + Bx + C$

(3) $\overline{y} = \frac{(x_1 + x_2)}{2}$

(4) As $n \rightarrow \infty$, $\left(1 + \frac{1}{n}\right)^n \rightarrow e$

(5) $\frac{xx'}{a^2} + \frac{yy'}{b^2} = 1$

第二章 专业英语翻译概论

翻译是把一种语言表达的思想用另一种语言再现出来的活动。专业科技文献的翻译是介绍国外科学技术的桥梁，它对于推动我国在尽可能短的时期内赶超世界先进的科学技术水平，加快本民族经济和文化的发展有着重要的意义。本章将简要介绍翻译的标准，过程，对译者的要求，英汉语言特点的对比，专业英语翻译的基本方法，专业英语中术语的翻译以及专业英语中数量的翻译等内容。

第一节 翻译的标准、过程及对译者的要求

一、翻译的标准

关于翻译标准，历来提法很多。比较著名的有鲁迅先生的信顺原则，严复的信达雅三原则以及英国翻译家泰特勒（Alexander Frase Tytler）的翻译三原则。由于翻译的目的是沟通不同的语言，使不同国家和民族的人民得以进行思想的交流，所以从总的要求来说，可以提出如下翻译标准：

第一，译文要忠实于原文，准确完整地表达原文的内容。使译文在表达思想、精神、风格和体裁方面起到与原文完全相同的作用。

第二，译文语言必须符合规范，用词造句应符合本民族语言习惯，要使用民族的、科学的、大众的语言，力求通顺易懂。不应有文理不通、逐字死译和生硬晦涩等现象。

翻译标准适合于一切译文，但由于原作的体裁不同，在具体的要求上，则应有所侧重。不能千篇一律。科技文献主要为叙事说理，其特点一般是平铺直叙，结构严密，逻辑性强，公式、数据和专业术语繁多。所以专业英语的翻译应特别强调“明确”、“通顺”和“简练”。所谓明确，就是要在技术内容上准确无误地表达原文的含义，做到概念清楚，逻辑正确，公式、数据准确无误，术语符合专业要求，不应有模糊不清、模棱两可之处。专业科技文献中一个概念、一个数据翻译不准将会带来严重的后果，甚至有巨大的经济损失。通顺的要求不但指选词造句应该正确，而且译文的语气表达也应正确无误，尤其是要恰当地表达出原文的语气、情态、语态、时态以及所强调的重点。简练就是要求译文要尽可能简短、精练，没有冗词废字，在明确、通顺的基础上力求简洁明快、精练流畅。

二、翻译过程

翻译过程大致可分为理解、表达、校对三个阶段。

（一）理解阶段

透彻理解原著是确切表达的前提。理解原文必须从整体出发，不能孤立地看待一词一句。每种语言几乎都存在着一词多义的现象。因此，同样一个词或词组，在不同的上下文搭

配中，在不同的句法结构中就可能有不同的意义。一个词，一个词组脱离上下文是不能正确理解的。因此，译者首先应该结合上下文，通过对词义的选择，语法的分析，彻底弄清楚原文的内容和逻辑关系。

（二）表达阶段

表达就是要寻找和选择恰当的归宿语言材料，把已经理解了的原作内容重新叙述出来。表达的好坏一般取决于理解原著的深度和对归宿语言的掌握程度。故理解正确并不意味着表达一定正确。

（三）校对阶段

校对阶段，是理解和表达的进一步深化，是使译文符合标准的一个必不可少阶段，是对原文内容的进一步核实，对译文语言的进一步推敲。校对对于科技文献的译文来说尤为重要，因为科技文章要求高度精确，公式、数据较多，稍一疏忽就会给工作造成严重的损失。

以上所说的理解、表达、校对三个阶段是互相联系、互相制约的，事实上它们三者是不可截然分开的。但是，正确理解原文是一切翻译的基础。为此，在翻译时要做到以下几点：

1. 首先要将原文全部阅读一遍，了解其内容大意，专业范围和体裁风格，然后开始翻译。如果条件许可，在动手翻译之前能熟悉一下有关的专业知识那就更好了。
2. 遇到生词，不要马上查词典，应该先判断是属于普通用语，还是属于专业用语。如果是专业词汇，则要进一步分析是属于哪一个具体学科范围的，然后再有目的地去查找普通词典或有关的专业词典。
3. 翻译时，最好不要看一句译一句，更不能看一个词译一个词。而应该看一小段（自然段），译一小段。这样做便于从上下文联系中辨别词义，也便于注意句与句之间的衔接，段与段之间的联系，使译文通顺流畅，而不致成为一句句孤立译文堆砌。更可以避免把“仰卧”（Lying on his back）译成“躺在他的背上”那种逐词死译所出的弊病。
4. 翻译科技文献并不要求象翻译文艺作品那样在语言形象、修辞手段上花费很大的功夫，但是要求译文必须概念清楚，逻辑正确，数据无误。文字简练，语句流畅。

三、对译者的要求

1. 用马列主义、毛泽东思想指导工作，认清科技翻译在社会主义建设中的重大作用。
2. 正确表达原意，不可错译或漏译，译文须符合汉语习惯，为此，要熟练地掌握原文语言和译文语言。精通原文语言是透彻理解的前提，熟练地运用译文语言是确切表达的条件。无论缺少哪一方面都会影响译文质量。
3. 对所译科技作品要具有一定的专业知识。若缺乏应有的专业知识，会直接影响到译稿质量，使读者难于理解，甚至会错误连篇，笑话百出。
4. 要有较广博的社会知识。一篇科技文献往往涉及范围很广。社会知识越广博，译文的准确性与质量就越有保证。

第二节 英汉语言特点的对比

英语发源于英国本土，已有近二千年的历史。目前，使用英语的国家有几十个（其中包括英联邦成员国和美国）。汉语历史则更长，从使用的人数来看则居世界第一。了解英语和汉