

全国研究生入学考试
英语复习指导丛书

长难句分析 与翻译

十大基本功

1000句精解

北京林业大学 季健 编著



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季健 编著

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前 言

阅读在考研中占有极其重要的地位，在考研总分中占 60%。（完形填空与英译汉就其本质而言也是阅读问题。）每年考研中约有 80% 的人落榜，其主要原因还是阅读没有过关。

在阅读过程中，经常会碰到长句结构，这是因为作者为能对客观事物的描述达到逻辑严密、准确完整，使用了各种从句和修饰性短语所致。毋庸讳言，长难句是阅读中的难点之一。要解决长难句问题，首先必须搞清楚构成长难句的要素是什么。简言之，长难句的构成主要有两大要素：其一，五大短语——介词、不定式、分词、动名词和形容词短语；其二，由各种连词引导的不同类型的复合句——并列复合句、主从复合句和并列主从复合句。

在英语中，介词占有极为重要的地位，因为英语基本上属于分析性语言，词性变化很少，主要通过介词来表示词与词之间的关系。而综合性语言，如俄语则主要是通过词形变化来表达这种关系。所以，要想正确地了解英语句子的结构、句中词与词之间的关系，就必须掌握介词与介词短语的用法。可以说，介词短语是五大短语中的重点。当五种短语孤立地、单独地在句中出现时，并不难理解，而当这五种短语交叉使用时，句子结构就复杂了。如，介词短语中带有不定式短语，或不定式短语中带有分词短语等等，形成“你中有我”，“我中有你”，这时要想断开一个短语从哪里“起”，到哪里“止”，都相当困难，常常会有“剪不断，理还乱”的感觉。

此外，某些短语还可与各种连词连用，如：不定式或介词和某些连词连用时，短语又带上不同的从句，这种短语结构就更加复杂了。

如果构成复合句的各分句结构简单，句子虽长，但理解起来并不困难。当五种短语交错地出现在简单句中，这样的简单句也就不简单了。如果这样的简单句作为分句（即从句）构成复合句，这就是长难句难理解的奥秘所在。

总之，在阅读中若能抓住这五种短语，就抓住了阅读中的主要矛盾，也就牢牢地牵住了“牛鼻子”。

笔者把阅读中所遇到的主要问题归纳为十大难点。这些难点与理解长难句有什么关系呢？

要理解长难句不能从长难句本身入手解决。长难句犹如一部复杂的机器，是由各个零部件组成的。如若不了解组成这部机器的零部件，不了解这些零部件的组成原理，要想了解长难句这部复杂“机器”只能是“望洋兴叹”。

组成阅读“机器”的零部件是什么呢？在阅读十大难点中，前九大难点就是构成长难句这部复杂机器的基本零部件，也可视为阅读理解的基本功。任何技能都有它的基本功，阅读也不例外。阅读不过关，看不懂长难句，其根本原因就是欠缺阅读理解技能所必须具备的基本功。九大难点或叫九大基本功是打开长难句这把“锁”的“钥匙”。必须指出：第十个难点是总其大成的长难句，它是阅读理解技能中重要的基本功。由此可见，阅读理解技能中有十大基本功。

本书收录了 1 000 个例句，选自各种书刊和科普文章。选取的原则是：第一，兼顾句子语法的典型性、词汇的适用性和内容的完整性；第二，句子内容属于基础理论或一般科技等，以适合各种不同专业的读者。

本书对各种例句进行了详尽的辨析，并为读者提供了分析长难句结构的方法。笔者认为，只有通过自己的实践，才能掌握分析方法和阅读技巧。读者一定要自己动手动笔去分析去翻译，然后参看注释和翻译，对照一下自己的理解是否正确。只要坚持不懈，大量实践，必能迅速提高自己的理解能力和翻译水平。

本书主要是为考研学子们编写的，但书中探讨的主要是阅读理解中的一般规律，参加大学四、六级考试、MBA 联考、博士生入学考试等各种考试的朋友们均可参阅本书，相信会有所帮助。

由于编者水平有限，书中缺点和疏漏在所难免，衷心希望广大读者批评指正。

编者

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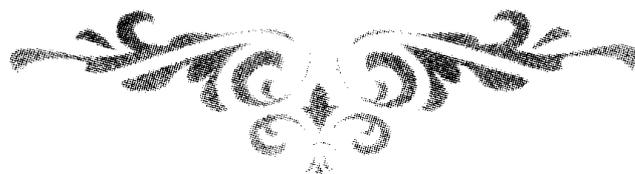
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第一难点 五大短语



介词短语

介词是学习英语的难点之一，特别在阅读过程中是一个“拦路虎”。介词短语是构成长难句的一个重要因素。介词短语可用作定语、状语、表语和补足语。介词可与动词、名词、形容词等连用。

这里特别指出一种介词复合结构，with (without) 构成的复合结构，这种复合结构的形式有：

- with + 名词 + 分词
- with + 名词 + 介词
- with + 名词 + 形容词
- with + 名词 + 动词不定式

这种结构在句中起状语、定语作用，或用来对句子或某一成分作补充说明。在这种结构中，with 没有实际词意。在翻译时可把名词和其后的介词短语或形容词当作主语和表语的关系来处理；把名词和其后的分词或动词不定式当作主语和谓语关系来处理。

(一) with + 名词 + 分词的结构

这种结构在英语中可称为“分词复合结构”。它在句中可作定语或状语。在科技文章中常用对句子或某个成分作补充说明。

(1) If something is moving, with nothing touching it, it will go on forever, coasting at a uniform speed in a straight line.

正在运动的某一物体，如果没有受到任何外力触动，它将永远继续作匀速直线运动。(条件状语)

(2) The light we see, with its colors ranging from deep red to deep violet, serves us in our daily lives.

我们看到的从深红色到深紫色的光，在日常生活中为我们服务。(作非限定性定语，修饰 light。)

(3) With more experimenting being doing every year, much of photosynthesis will certainly be known before very long.

随着每年所进行的实验增多，可以肯定，不久将会对光合作用了解得更多。(条件状语)

(4) The article deals with microwaves, with particular attention being paid to radio location.

这篇文章是研究微波的，其中特别注意无线电定位问题。(with...location 是分词复合结构，在句中作补充说明。)

(5) The bottom layer is solid bedrock, with its upper edges slowly decomposing, or decaying, and flaking off.

底层是坚硬的基岩，它最上面的边缘在慢慢地分解、腐蚀和剥落。(非限定性定语，修饰 Solid bedrock。)

(6) Ice, of relative density 0.9, floats in water with nine-tenth submerged.

冰的比重为 0.9，它浮在水面上时，9/10 淹没在水里。(方式方法状语)

(二) with + 名词 + 介词的结构

(1) Maxwell pointed out that an object may be hot without the motion in it being visible.

麦克斯韦指出，即使看不见物体内部的分子运动，物体也可能是热的。(让步状语)

(2) Under a microscope, a cell looks like a bit of clear jelly with a thin wall round it.

在显微镜下，细胞看上去如一滴透明的胶状物体，周围有一层很薄的壁。(with...it 作定语，用来修饰 jelly。)

(3) Mechanics is that branch of physical science which considers the motion of bodies, with rest as a special case of motion.

力学是自然科学的一个分支，它研究物体的运动，而把静止看成是运动的一种特殊情况。(with 引出的复合结构起补充说明作用。)

(4) Carbon, with 6 protons and 6 neutrons in its nucleus, has 6 electrons.

碳有 6 个电子，而在其原子核内尚有 6 个质子和 6 个中子。(with 6 protons...in... 用来对 carbon 作补充说明，有非限定定语意味。)

(5) The rocket engine, with its steady roar like that of a waterfall or a thunderstorm, is an impressive symbol of the new space age.

火箭发动机以其类似于瀑布或大雷雨的持续轰鸣给人以深刻印象，成为太空新时代的象征。(with...roar like... 是非限定性定语，修饰 engine。)

(6) In each case the crystals, small or large, are naturally bounded by square or rectangular crystal faces of different sizes, but with each face always at right angles to each adjacent face.

在每种情况下，各个晶体不论大小都是天然地由一些正方形的或矩形的晶面作为自己的界面，这些晶面大小不一，但每一晶面总是垂直于每一相邻面。(with...face...at... 是复合结构，作定语，修饰 crystal faces。)

(三) with + 名词 + 形容词的结构

(1) We have discussed fluorescence, which is sensitive to radiations with energies equal to or greater than those of visible photons.

我们已经讨论过荧光，荧光对等于或大于可见光光子能量的辐射是很敏感的。(with + 名词 + 形容词的复合结构，起定语作用，修饰 radiations。)

(2) In simple harmonic motion, where there is no damping, the energy of the vibrating particle changes from kinetic to potential and back, with the total energy constant.

在没有阻力的简谐运动中，振动质点的能量由动能变为势能，或由势能变为动能，但总能量不变。(with + 名词 + 形容词的复合结构在句中有结果状语的意味。)

(3) An uncharged object contains a large number of atoms, each of which normally contains an equal number of electrons and protons, but with some electrons temporarily free from atoms.

不带电的物体含有大量原子，每个原子通常含有等量的电子和质子，但是有一些电子暂时脱离了原子的束缚。(with + 名词 + 形容词的复合结构，对句子起补充说明作用。)

(4) And with water present the chances of finding some sort of life on Mars are much brighter.

由于水的存在，在火星上找到某种生命的可能性的前景就光明得多了。(with water present 作原因状语。)

(四) with + 名词 + 动词不定式的结构

(1) In outer space, with no swaddling atmosphere to diffuse it, sunlight is infinitely more powerful than on earth.

在外层空间，由于没有大气保护层对阳光的保护作用，那里的阳光要比地球上强烈得多。(swaddling “襁褓”，这里有“保护”的含义。with 引出的复合结构用作原因状语。)

(2) At present, about 80 different metals are known to man. But with so many metals to choose from, the question arises: which metal shall we use?

目前，人们已知的金属大约有 80 种。由于有这么多的金属可供选择，于是便产生了一个问题：我们将采用哪种金属呢？(with 引出的复合结构用作原因状语。)

介词短语在句中分析与翻译的实例

1. You can already buy small video telephones, with built-in screen and cameras, that transmit still images over regular telephone lines to anyone else with a video telephone.

现在已能买到小型的电视电话机，机上装有屏幕和摄像机，可以通过平常的电话线把静止

的图像传送给任何一个有电视电话的人。(with...cameras 用作独立定语, 修饰 telephones。)

2. The scientific worker attempts to formulate these problems in accurate terms and to solve them in the light of all the relevant facts that can be collected by observation and experiment.

科学工作者力图精确地描述这些问题, 然后根据通过观察和实验收集到的有关事实来解决这些问题。(介词短语 in accurate terms 作方式方法状语, 说明 to formulate。in the light...experiment 作方式方法状语, 说明 to solve。)

3. The atom is analogous to a miniature solar system, with a nucleus as the “sun” and electrons as the “planets” revolving in orbits around the nucleus.

原子类似于一个小型太阳系, 原子核可看作“太阳”, 电子可看作是沿轨道绕着核旋转的“行星”。(analogous to, “与……相似”。with a nucleus as..., and (with) electrons as... 是 with 引出的复合结构, 用来对 solar system 作补充说明。)

4. The unit of heat on the c.g.s.system is the calorie, which is established as the amount of heat required to raise one gramme of water by one degree centigrade.

热的厘米·克·秒制单位是卡, 将 1 克水升高摄氏 1 度所需的热量定为 1 卡。(c.g.s.system = centimeter-gramsecond system, “厘米·克·秒制”。介词短语 on...system 作定语, 修饰 unit。by 所引导的介词短语是 raise 要求的, 这里 by 表示数量增减的绝对值。例如: increase by 10%, “增加 10%”; decrease by two orders of magnitude, “减小两个数量级”。)

5. Sometimes the individual crystals, with plane faces and sharp edges and corners, are visible to the naked eye, and sometimes they can be seen only under a microscope.

单晶有时用肉眼就能看得到, 有时只有在显微镜下才能看得见, 这种单晶有着平的晶面和锐利的棱角。(with plane faces...corners 是介词短语用作独立定语, 修饰 crystals。)

6. Modern Japan and other Oriental countries are emerging with the irresistible urge for better standards of living and a novel, powerful role in the world's economy.

在不可阻挡地迫切要求提高生活水平和在世界经济中发挥新的、强有力的作用的驱使下, 现代的日本和其他东方国家正在崛起。(with...economy 有条件状语的意味, 用来修饰 emerging。)

7. Liquids, however, are highly incompressible; that is, very large pressures, of the order of thousands of tons per square inch, are required to diminish their volumes appreciably.

但是，液体是非常不易压缩的；要明显地压缩液体的体积，就需要巨大的压力，其数量级达每平方英寸几千吨。（介词短语 of the order...inch 是独立定语，修饰 pressures。）

8. One suggestion has been the use of mixtures of two different types of insecticide, with the idea that one of them should eliminate the individuals resistant to the other.

有一种设想是使用两种不同类型的混合杀虫剂，其想法是如果害虫对其中之一有抗药性，那么另一种就能杀死它。（介词短语 with the idea...the other 作 two types of insecticide 的定语，对它作补充说明。that 引导的从句作 idea 的同位语。resistant to the other 是形容词短语作 individuals 定语。）

9. The side of Mercury which is turned away from the sun remains in eternal darkness, with a temperature only a few degrees above absolute zero.

水星背向太阳的那一面，却永远处于黑暗之中，那里的温度仅比绝对零度高几度。（with a temperature above 对 the side of Mercury 补充说明。）

10. No distinction can be drawn between pure and applied science in terms of differences in the training or competence of workers, or in organization, or in method, or even in the immediate outcome of the work.

不能根据工作人员的训练程度和资格、组织机构、研究方法甚至研究工作的直接成果等方面的差别来划分理论科学与应用科学的界线。（between...science 作定语，修饰 distinction。in terms of... 作状语，说明 can be drawn。）

11. An object with at least one easily measurable property which changes appreciably while the object is coming to thermal equilibrium may be used as a temperature-measuring device, or thermometer.

当一种物质进入热平衡时，至少具有一种变化显著因而易于测量的特性，这种物质可用来作为测温装置，即温度计。（with...equilibrium 用作定语，修饰 An object。）

12. If we could go on an imaginary journey from the surface to the centre of a star such as the Sun, we would find a steady increase in temperature and pressure.

如果我们能从像太阳这样的恒星的表面到其中心作一次想像的旅行，我们会发现温度和压力将持续不断地增加。(from...to...the Sun 用作定语，修饰 journey。)

13. The fact that a compass needle assumes a northsouth direction leads to the conclusion that the earth must be a magnet, with the space all around it constituting a huge magnetic field.

指南针指向南北方向这一事实可导出这样的结论：地球必定是一个磁体，地球周围的所有空间构成了一个巨大的磁场。(句中两个 that 引导的都是同位语从句。with...field 是分词复合结构，起补充说明作用。)

14. The second aspect is the application by all members of society, from the government officials to the ordinary citizen, of the special methods of thought and action that scientists use in their work.

第二方面涉及从政府官员到普通公民等所有社会成员运用科学家在工作中所用的思维和行动的特定方法。(from...to... 作非限定性定语修饰 members。by 和 of 所引导的两个介词短语均修饰 the application, of... 短语被两个介词短语分隔开了。)

15. Chemistry has two main aspects: descriptive chemistry, the discovery and tabulation of chemical facts; and theoretical chemistry, the formulation of theories that, upon verification, unify these facts and combine them into a system.

化学有两个主要方面：叙述性化学，即化学事实的发现和制表；理论化学，即对化学理论的系统阐述，根据验证把化学事实统一起来，从而归纳成一个体系。(the discovery...facts 是 descriptive chemistry 的同位语，the formulation...a system 是 theoretical chemistry 的同位语，其中 that 引出定语从句，upon verification 用作状语。)

16. Every body in the universe attracts every other body with a force directly proportional to the product of the masses of the two bodies and inversely proportional to the square of the distance between them.

宇宙中每一物体都以一引力吸引另外的每一物体，该引力与两物体质量的乘积成正比，而与两物体之间的距离平方成反比。(with a force... 是状语，说明 attracts。directly proportional

to..., “与……成正比”; inversely proportional to..., “与……成反比”。这两个形容词短语用来说明 force。)

17. For an Italian contemplating anything from paying his taxes to getting a peddler's license or collecting an old age pension, the nation's million-man bureaucracy is a nightmare.

对意大利人来说, 无论打算做什么事, 从纳税到申请零售商执照或领取老年人的退休金, 全国上百万个官僚主义者真令人不寒而栗。(For...pension 介词短语是 nightmare “恶梦”要求的。例: It was a nightmare for me. from...to...pension 作定语修饰 anything。)

18. Scientists in the U.S., Western Europe and Japan are pushing hard toward a still much-in-the-future optical computer that uses photons rather than electrons for number-crunching efficiency.

美国、西欧和日本的科学家们正在全力以赴地研制那种更富光明前景的光子计算机, 该机将利用光子而不是电子来提高数据处理的效率。(use...for..., 用……来……)

19. With the invention of the electromagnetic generator in the latter part of the nineteenth century, it became possible to convert the energy of burning fuel to electricity which could then be transmitted to distant points for use.

19 世纪末叶, 由于发明了电磁发电机, 从而有可能把燃烧燃料而获得的能量转变为电能, 然后再输送到遥远的地区使用。(convert...to..., 把……转变为……。)

20. If a piece of rock, of anything else, one inch in diameter were magnified to the size of the earth, its constituent atoms would become about the size of tennis balls.

如果把直径为 1 英寸的一块岩石或一块别的什么东西放大到地球那样大, 那么它的组成原子大约会变成网球那么大。(of anything else 前后有逗号, 是非限定性定语, 修饰 a piece。)

21. Inability to build high-voltage generators and motors gives to the transformer immediate recognition as a highly flexible link between the generation and distribution of electrical energy.

制造高压发电机和高压电动机是不可能的, 这就立即使人们认识到变压器是发电与配电之间灵活性很高的中间环节。(本句是简单句。主语是 inability, 谓语是 gives, 宾语是 recognition。不定式短语 to build...motors 作定语, 修饰 inability。give recognition to...as..., “承认

……是……”。介词短语 between...energy 作定语，修饰 link。)

22. The mildness of its climate, with slight temperature variations and infrequent rainfall, combined with a high average level of sunshine and brilliant shies, all make it idea for tourism whether by winter or by summer.

宜人的气候、变化不大的温度、稀少的雨量、灿烂的阳光以及明媚的天空，所有这一切使突尼斯成为冬夏理想的旅游胜地。(with... 和 combined with 把三个主语连接起来。all 是总括词，总括上述的三个主语。idea 是 it 宾语补足语。it 代替上文中 Tunisia 突尼斯。by winter... 这里 by 作“当……时候”解。例：They don't work by day but by night. 他们日间不工作，夜间工作。whether...or, “不论是……还是”，用作连词，连接两个并列成分。)

23. We explain the differences between gases and liquids by saying that the molecules in a liquid are not moving about so freely as the molecules in a gas and are very much closer together.

液体分子不像气体分子那样能自由地到处运动，而是比较紧密地聚集在一起，我们以此来解释气体和液体之间的区别。(介词短语 by saying... 作方式方法状语，说明谓语 explain。)

24. For about the last 200 years, the structural theory has been developed by scientists, mathematicians and engineers, with the very practical object of providing a reliable basis for the design of structures by calculation.

大约近 200 年来，科学家、数学家和工程师们发展了结构理论，其目的在于通过计算给结构物的设计工作提供可靠的基础。(with...object...for... 是介词复合结构，起目的状语作用。)

25. By the quiet persistence of the truth-seekers, working upstream against the flow of ancient prejudice, mankind has entered into new realm of health, and the borderlines of death have been pressed farther back.

由于真理探索者顶着守旧派偏见的逆流，默默无闻、坚持不懈地努力工作，人类才得以进入了新的健康王国，而死亡的界线则被抛到离我们更远的地方。(介词短语 By...truth-seekers 用作原因状语，说明谓语动词 has entered。)

26. When a man picks up a weight from the floor and raises it above his head, he has in effect

inserted his body between the weight and the earth and pushed the weight one way with his hands, and the earth the other way with his feet.

当一个人从地板上拿起重物并把它举到头顶上时，实际上他是把自己的身体置于重物与地面之间，他用双手朝着一个方向推着重物，而用双脚朝着另一方向推着地面。(pick up, “拿起”。in effect, “实际上”。one way, “朝着一个方向”。the other way, “朝着另一方向”。这两个短语前均省略介词 in, 作状语。and 与 the earth 之间省略了谓语 pushed。)

27. But this is not possible because of the size of the country, with the distance from Dehli to Madras, for example, being greater than that from London to Rome.

但这是不可能的，因为印度面积大，譬如，从德里到马德拉斯的距离，就比伦敦到罗马还要远。(with + 名词 + 分词的结构，可用作状语和定语。句中 with the distance...being 用作定语，对 size 进行补充说明。that from...that 代替 distance。)

28. Even at this moment many of the earth's natural treasures are being destroyed, many valuable animals and plants are being killed off, it is becoming increasingly difficult to grow enough foods to preserve much of the earth's population from starvation.

甚至现在，地球上的许多自然财富正遭到破坏，许多珍稀动植物已面临灭绝之灾，为使地球上大多数人口免于饥饿而生产出足够的粮食也越来越困难了。(to preserve...from, “使……免于”。)

29. If the Earth, Moon and Sun move into a direct line, with the Moon in the middle, the dark body of the Moon blots out the brilliant disk of the Sun, and we witness a solar eclipse.

假如地球、月球和太阳运行到一条直线上，月球在中间，那么月球的暗体就遮住了太阳的亮盘，于是我们便看到日食。(with the Moon in the middle 是 with 引出的介词复合结构，在句中起补充说明作用。)

30. As natural science treats of the mutual transformation, changes and development of various kinds of matter, it is of great importance for us to make a profound study of it so that we may control the phenomena of nature.

由于自然科学研究的是各种物质的相互转化、变化和发展，因而我们深入研究自然科学以便控制各种自然现象，这具有重大意义。(treat of..., “论述”。带逻辑主体 for us 的不定式短

语 to make...nature 作主语，it 是形式主语。so that 引导目的状语从句。be of...，“具有”。)

31. With irrigation came surplus food, which meant that large numbers of people were freed from the land to pursue nonagrarian specialities – technological development, scholarship for its sake – and war.

随着有了灌溉，粮食就有了剩余，这就意味着大批人就可解脱出来从事农业以外的工作——发展工艺，研究其学问——甚至参加战争。(with...“随着”，引导的短语作状语。With the approach of sunset it became chilly, came surplus food 是倒装语序，food 是主语，came 是谓语。which 引导特种定语从句，指上句话。不定式 to pursue...war 有结果状语的意味。)

32. First of all, Kepler found that each planet goes around the sun in a curve called an ellipse, with the sun at a focus of the ellipse.

开普勒首先发现了每个行星都以椭圆曲线绕太阳运行，太阳则位于椭圆的焦点。(with the sun at... 为介词复合结构作状语，补充说明。)

33. It should be noted that a rocket does not depend on the atmosphere for its propulsion, but would actually perform better in the absence of an atmosphere because of lessened air resistance.

应该注意，火箭的推力与大气无关，在没有大气的情况下，由于空气阻力减小，火箭实际上会运行得更好。(in the absence of an atmosphere 含有虚拟条件的意味。)

34. Electrical power is always carried over long distances as a high-tension current at low-current strength. It is also sent as an alternating current, for such current is comparatively easily transformed either up or down in voltage.

电力总是以高电压低电流的方式进行远距离输送的，又是以交流电的形式送电的，因为这种交流电易于升压或降压。(两个 as 构成的介词短语都用作方式方法状语，分别说明 is carried 和 is sent。)

35. When one considers the immense change in the size and reliability of computers and all other electronic devices that has taken place, it is clear that computers for doing this type of control of movement according to sense impression will certainly be available.

当我们考虑到计算机和其他所有电子器件在尺寸和可靠性方面所发生的极大变化时，就不

难明白，根据感觉进行这类活动控制的计算机一定会出现。(for...movement 是 computers 的定语，介词短语 according to sense impression 作状语，说明动名词 doing。)

36. In 1664 the great English diarist, John Evelyn, published, with the approval of the Royal Society of London, a book Sylva or a Discourse of Forest Trees in which one sees, perhaps for the first time, a realization that trees, then so important in the construction of ships, were indeed becoming sadly depleted and that something urgently needed to be done by way of deliberate planting to ensure enough for the future.

1664年，英国伟大的日记作家 J·Evelyn，经伦敦皇家学会批准出版了一部森林志，即《林木论》。在这本著作中，人们可以说是第一次了解到一个现实：当时，在造船业中如此重要的树木的确正在悲惨地遭到浩劫；必须采取紧急措施，通过认真植树以便确保未来有足够的树木。(with...London 介词短语作条件状语修饰 published，其宾语是 a book。在 which 定语从句中，one 泛指人们。a realization 是谓语 sees 的宾语。so important in...ship 是非限定性定语，用来修饰 trees。句中两个 that 均引导同位语从句用来揭示 realization 的概念内涵。)

37. As a magnetic material becomes more and more magnetized, more and more of its magnetic domains line up, with their north poles all pointing in one direction and their south poles in the opposite direction.

随着材料的磁性变强，材料中越来越多的磁畴便会排列起来，其 N 极均指向一个方向，而 S 极则指向相反的方向。(介词复合结构 with... 用来对主句中的谓语 line up 进行补充说明。)

38. Since the earth is slightly flattened at its poles, the distance of its surface at the north pole or south pole from its center is less than that at the equator.

由于地球的两极略为扁平，所以南北两极地表面离地心的距离比赤道地表面离地心的距离要近一些。(distance from..., “离……的距离”。that 代替 distance。)

39. Solar energy seems to offer more hope than any other source of energy, particularly since those areas most in need of water lie rather close to the equator and have a relatively clear atmosphere.

太阳能似乎比任何其他能源更有希望，尤其是因为这些迫切需要水的地区离赤道很近，那

里有较清洁的大气。(lie 和 have 是两个谓语，主语是 those areas。most in need of water 为介词短语作定语修饰 areas。)

40. For a very long time man has been seeking the possibility of combining various metals into alloys with a view to obtaining better materials for given purposes.

长期以来，人们一直在寻找把各种金属熔成合金的可能性，其目的在于为某些用途获得更好的材料。(with a view to...，“以……为目的”，“为……起见”，是短语介词，引出的介词短语起目的状语作用。)

41. It means reorganising them on democratic lines, with governing boards made up of workers and technicians from the trade unions concerned, loyal to the concept of nationalisation as a force for social changes and operating their industry according to a national plan arrived at democratically by the community as a whole.

这意味着：要以民主的方式，由有关工会的工人和技术员所组成的管理董事会来改组各项工业。这些工人和技术员作为社会改革的一支力量要忠实于国有化这一观念，同时他们必须按照由作为整体的社会用民主方法制定的全国性计划来管理各工业。(on...lines，“按照……方针，办法”，作状语。with...concerned 介词短语作状语，用来修饰动名词 reorganising。made up of... 过去分词短语作定语修饰 boards。loyal...changes 为形容词短语修饰 workers and technicians。as force for social changes 是“工人和技术员”的同位语，operating...as a whole 为现在分词短语作定语，也是用来修饰 workers and technicians。它是与形容词短语 loyal... 是并列关系。arrive at 作出（决定），得出（结论）等。句中 arrived at...whole 是过去分词短语作定语修饰 plan。)

42. Thirty-five seconds into the flight, with the solid rockets pumping out maximum power, Challenger – like all its predecessors – was undergoing severe aerodynamic stress.

“挑战者”号在其固体燃料助推火箭发出最大推力的推动下，飞行了 35 秒后，同以前的航天飞机一样，正在承受着巨大的空气动力的压力。(with the solid... 复合结构用作状语，有条件意味。)

43. A gas, such as steam (water vapor) in the cylinder of a steam engine, has neither definite shape nor definite volume – it changes its shape and also its volume with change in the shape and

volume of the container.

气体，例如蒸汽机汽缸中的水蒸气，既无一定的形状，也无一定的体积。气体的形状和体积是随着容器的形状和体积的改变而变化的。(change...with, “随……而变化”。)

44. Their wide use in industry is due not only to these properties but to the fact that the common metals can be shaped into required objects by deformation and by casting into mold, and to the fact that their properties can be greatly altered by alloying with other metals.

金属在工业中之所以得到广泛的应用，不仅是由于它们具有上述这些性能，而且还由于普通的金属可以通过加工和铸造而形成所需要的制品，同时还由于金属的特性可通过与其他金属熔成合金而显著地改变。(due to, “由于”。to these properties, to the fact, and to the fact 都是 due 所要求的。句中两个 that 均引出同位语从句。)

45. Newton generalized the idea by supposing that any two particles in the universe gravitate towards each other with a force varying inversely as the square of the distance between them and directly as the product of their masses.

宇宙中任意两个质点均以某种力在相互吸引，该力与两质点之间距离的平方成反比，而与它们质量的乘积成正比，牛顿就是通过这一假设概括了这种思想。(with a force varying... 为介词复合结构，用作状语，说明 gravitate。vary directly as..., “与……成正比”。vary inversely as, “与……成反比”。)

46. If an engineer applies a formula or a tabulation or a curve blindly, without knowing its history, its accuracy and the limits of its applicability, the results that he obtains will be neither intelligent nor practical.

如果一个工程师盲目地应用一个公式、一张图表或一条曲线，而对它的来历、精确度和应用范围却一无所知，那么他所得到的结果既不明智，也不实际。(without...applicability 介词短语作谓语 applies 的条件状语。that 引导定语从句，在句中作 obtains 的宾语。)

47. The neutron carries no electrical charge and in some respects acts as though it were composed of a proton and electron combined, with the positive charge of the proton neutralized by the negative charge of the electron.

中子不带电荷，并且有点像是由质子和电子结合而成的，质子的正电荷被电子的负电荷中

和了。(in some respects, “在某些方面”, “有点”。act as though, “表现得似乎”。as though 引导方式方法状语从句, 其谓语常用虚拟语气。句末 with 引出介词复合结构, 对前句的谓语作补充说明。)

48. We know that the rate of cooling from above the critical range will greatly change the structure and therefore the properties of any steel.

我们知道, 从临界温度以上冷却的速率会大大改变任何一种钢的结构, 从而会改变其性能。(from above..., “从……以上”, 是双重介词。)

49. Increasing problems of all kinds with fossil fuel power plants are turning power and utility companies more and more to the use of nuclear powered electric generating plants.

矿物燃料发电厂所产生的问题日益增多, 这就促使电力公司和公用事业公司越来越倾向于采用核动力发电厂。(problem...with, “在……方面产生的问题”, with 有表示“范围”。)

50. Ever since, people have had difficulty in deciding whether the hovercraft should be ranged among ships, planes, or land vehicles – for it is something in between a boat and an aircraft.

从那以后, 人们感到很难确定把这种气垫船归为哪一类: 船、飞机还是车辆, 因为它是一种介于船与飞机之间的交通工具。(in between, “介于两者之间”, 作定语修饰 something。)

51. The electric resistance of a wire is the ratio of the potential difference between its two ends to the current in the wire.

导线的电阻等于该导线两端之间的电位差与导线中电流的比值。(to the current... 是 ratio 要求的。the ratio of A to B, “A 与 B 之比”。)

52. Pollution is caused either by man's release of completely new and often artificial substances into the environment, or by releasing greatly increased amounts of a natural substance, such as oil from oil tankers into the sea.

引起污染有两种途径: 一是人们经常把全新的人造物质释放到环境中, 或是把大量的天然物质譬如油轮溢出的石油释放到海里。(此句为简单句, 主要是由两个 by 引出的短语把这个句变得复杂了。第一个 into 是名词 release 要求的。第二个 into 是动名词 releasing 要求的。from oil tankers 作定语修饰 oil。)

53. Hardening of grey cast iron may be carried out by heating the casting to above the critical range and then cooling it, usually in oil.

灰口铸铁的淬火过程是：先把铸铁加热到临界温度以上，然后加以冷却，通常在油里冷却。(heating...to above, “把……加热到……之上”。to above 是双重介词。)

54. Motion in the most general sense, conceived as the mode of existence, the inherent attribute, of matter, comprehends all changes and processes occurring in the universe, from mere change of place right up to thinking.

从最普遍的意义上来讲，可以认为运动是物质存在的形式，是物质的固有属性，运动包括宇宙中所发生的一切变化和过程，从单纯位置的变化直到思维。(主语是 motion, 谓语是 comprehends, 被一个介词短语 in the most general sense 和一个分词短语 conceived as... 隔开了。of matter 既说明 existence, 也说明 attribute. 介词短语 from... 用来说明 all changes and processes。)

55. The air is heated by the flame, expands, and thus becomes less dense. Denser air flows in from below and the result is that irregular layers of air of different densities are formed above the flame.

空气受火焰加热而膨胀，于是变得比较稀薄。较密的空气从底下流入，其结果是，火焰上方形成了密度不同的不规则的空气层。(flow in, “流入”。from below, “自下”，“从下面”。above the flame 作地点状语。)

56. Weather is a product of many physical factors operating in and on the troposphere with the principal ones being the unequal heating of the earth's surface by the sun and the rather rapid rotation of the planet on its axis.

天气是许多自然因素在对流层中起作用并对其施加影响的结果，其中太阳对地球表面加热不均等和地球自转比较快则是主要的因素。(with 引导的复合结构作定语，用来修饰 factors, ones 代替 factors。)

57. It is the village which suffers most, for it is not easy to break the traditional bonds uniting agriculturist families to families of craftsmen, nor to dispel the idea that some one who follows the

traditional calling of this caste is acting in a more “suitable” way than some one who takes up a different occupation.

乡村受害最大，因为从事农业家庭与从事手工业家庭的传统结合是很难分割的。此外，一些人认为一个人遵照等级制度的传统职业来办事要比从事不同的职业更为“合适”，这种想法也很难去掉。（It is...which 为强调句型，强调主语 the village. 原句是简单句，The village suffers most. for 是连词，“因为”。uniting...to, “把……与……连接”，是分词短语作定语修饰 bonds. nor 连词，连接两个并列成分，把 to break... 和 to dispel... 两个不定式短语连接起来。that...occupation 为同位语从句，用来揭示 idea 的概念内涵。calling 意为“职业”，与 occupation 相呼应。in a...way, “以……方式”。）

58. Forging and press-production methods of shaping metal are of tremendous importance in machine-building in general, and in automobile and tractor industry in particular.

金属成形的锻压加工方法，一般在机器制造业、特别是在汽车和拖拉机工业中具有重大意义。（be of..., “具有”。in general, “通常”；in particular, “特别”，这两个短语介词在句中作插入语用。）

59. In fact, in the nineteenth century people used to make gardens in the shape of a clock face, with different flowers opening at different times.

在 19 世纪，人们常常把花园做成钟盘形，不同的花在不同的时间开放。（with 引导的复合结构有定语的意味，用来对 the shape of a clock 进行修饰。）

60. The modern scientific method was born with Galileo in the 17th century; however, the development of the natural sciences began to gain speed only in the latter part of the 18th and the early part of the 19th centuries.

现代科学方法产生于 17 世纪的伽利略时代；然而，只是在 18 世纪后期和 19 世纪初期，自然科学才开始迅速发展。（with Galileo...century 有表示时间与空间范围之意，这里是表示时间即伽利略时代。）

61. All of the atoms of an element contain the same number of protons in their nuclei, and the atoms of one element differ from those of all other elements in the number of protons so contained.

同一种元素的所有原子的原子核中含有的质子数都是相同的，而一种元素的原子与其他一

切元素的原子的不同点，就在于它们含有的质子数不同。(A differs from B in C. A 与 B 在 C 方面是不同的。句中 in the number... 是 differ 要求的。)

62. The kinds of evidence for the roundness of the world that led finally to its general acceptance included such data as the shape of the shadow of the earth on the moon during an eclipse of the moon, the fact that as one sails from port on a ship the building of the port gradually seem to sink below the surface of the water, and, most convincing, the fact that it is possible to sail all around the world and return to the starting point of the voyage .

最终为人们普遍接受的有关地球是圆形的种种论据，包括：月蚀时地球投在月球表面的阴影形状；当人们乘船离开港口时，港口的建筑物似乎逐渐沉入水下；而最令人信服的是，人们环绕地球航行时，有可能又回到原来的起航点。(The kinds 为主句中的主语，谓语是 included。介词 as 引导三个并列同位语：shape, the fact, the fact, 说明 data。在两个 fact 后的 that 都引出同位语从句。)

63. The technological breakthrough and the Industrial Revolution brought with them a mastery of food production and control of infectious disease that reduced the normal death-rate to below 1.5 per cent.

技术革新和工业革命促进了食品生产，控制了传染病的流行，这使人口正常死亡率降到 1.5% 以下。(to below 是双重介词，reduce...to below, “降到……以下”。)

64. There are a few specially designed homes that are heated primarily by the sun but there is no practical and economic means for converting solar energy directly into that great convenience, electricity.

现在已有一些专门设计的住宅主要利用太阳能取暖，但还没有一种实用和经济的办法把太阳能直接转化为便于使用的电能。(介词短语 for...electricity 用来修饰 means。converting...into, “把……转化为……”。)

65. A balance consists of an arm balanced at its middle, with known weights hung on one hand and the object whose weight is to be found on the other.

天平由一个在中央平衡的臂组成，已知重量的砝码挂在平衡臂的一端，而把要称出重量的物体挂在平衡臂的另一端。(分词短语 balanced at its middle 用来修饰 arm。with...weights

hung... 是介词复合结构, 用来对 balance 作补充说明, 过去分词 known 作定语, 修饰 weights。hung 是 hang 的过去分词。)

66. You should also learn as much about chemistry as possible from your own experience in the laboratory and from your observations of chemical substances and chemical reactions in everyday life.

你们也应该从你们自己的实验室经验中, 从你们日常对化学物质和化学反应的观察中学习更多的化学方面的知识 (learn...from..., “从……学……”。句中两个 from 均为 learn 要求的。)

67. You will notice that specific gravity is always the ratio of two weights, and so it is a pure number, such as 3 or 5.25, without any unit associated with it.

你们将注意到, 比重总是两个重量之比, 因而它是一个纯数, 譬如 3 或 5.25, 无需给它定义任何单位。(without...it 是分词复合结构, 有结果的意味。)

68. With the increased production made possible by the assembly line, automobiles became much cheaper, and more and more people were able to afford them.

由于装配线所带来的增产, 汽车价格便宜多了, 买得起汽车的人越来越多。(介词短语 with... 用作原因状语。)

69. Today physicists find that light has the characteristics of both waves and particles with one aspect sometimes predominating and sometimes the other.

物理学家现在发现, 光具有波粒二重性, 有时波动性起主要作用, 有时粒子性起主要作用。(with...the other 是分词复合结构, 在句中作补充说明。)

70. It is a matter of common observation that a body A cannot exert force on a second body B without B at the same time exerting force on A.

这是我们通常都能观察到的情况: 如果物体 B 没有同时对物体 A 施加作用力, 那么物体 A 也不能对 B 施加作用力。(without 引导的介词复合结构为条件状语, 用来说明谓语 cannot exert。)

71. Without the sun's light warming the earth's surface, it would be so terribly cold that life

could not exist .

如果没有阳光来加热地球的表面，地球就会变得非常寒冷，使得生命无法生存。(without 引导的复合结构，在句中起条件状语作用。)

72. Just as the length and cross-section of the pipe affect the flow of water so it is with conductors of electric current.

正如管道的长度和截面会影响水流一样，导体对电流的影响也是如此。(with 表示关系和范围，有“关于”，“对”，“就”之意。)

73. Water vapor may vary from almost nothing to as much as 4% and is not usually included with the other constituents which, in terms of global averages, do not vary significantly.

(大气中)水蒸气的含量是变化的，从近乎为零到多达4%，通常不与其他成分一起计算，根据总平均值来看，其他成分的含量变化不大。(句中 with 表示事物之间的关系。参看上句。)

74. This atom, with 92 electrons spinning about the closely packed and complex nucleus, is the element uranium, which seems to be the most complicated of the natural atoms.

这一有着92个电子围着又密集又复杂的原子核旋转的原子，就是元素铀。它似乎是天然原子中最复杂的原子了。(句中 with 引出的是一个介词复合结构，作定语，修饰 atoms。)

不定式短语

动词不定式是学习英语的难点之一，也是构成长句的一个重要因素。不定式有自己的宾语、状语和补足语，组成不定式短语。在分析句子时要把不定式短语看作一个整体。不定式在句中可作主语、表语、宾语、定语、状语和补足语。

不定式短语在句中分析与翻译的实例

75. You will remember that the materials which combine to make a mixture do not completely lose their individual qualities. They do not do so because their molecules are not broken up and built into new molecules with new qualities.

你们要记住，组成混合物的各种物质完全没有失去它们各自的性质。它们之所以这样，是因为它们的分子并没有分解，没有形成具有新性质的新分子。（不定式短语 to make a mixture 是谓语 combine 的结果状语。）

76. The moon's pull causes water in the oceans to be a little deeper at the point closest to the moon and also at a point farthest from the moon, on the opposite side of the earth.

月球的引力会引起近月点处和地球另一端的远月点处海洋的海水略深一些。（cause sth. to do sb, “引起……作……”。to be a little deeper... 作 water 宾语补足语。）

77. It is also a familiar fact that a force is required to slow down or stop a body which is already in motion, and that a sidewise force must be exerted on a moving body to deviate it from a straight line.

要使一个已经运动的物体慢下来或使其停止运动就需要作用力；要使该物体偏离直线运动，就需要横向作用力，这也是大家所熟悉的事实。（it 是形式主语，代替 that 引出的两个主语从句。不定式短语 to deviate...line 是目的状语，其中 it 代替 the moving body。）

78. Though only 107 elements have been discovered, they combine in enough different ways to make the millions and millions of different things in the world.

虽然只发现了 107 种元素，但是这些元素以不同的方式化合在一起就会形成世界上无数的千差万别的东西。(不定式短语 to make... 作结果状语，说明 enough。)

79. Since we have already associated flow of charge or current with the existence of potential difference, it becomes of interest and importance to establish a quantitative relation between these two quantities.

因为我们已经把电荷的流动即电流与电位差的存在联系起来，因而在这两个量之间确立一种数量关系就成为重要而值得注意的问题了。(不定式短语 to establish...quantities 是主语，it 是形式主语。)

80. Apart from the enormous outflow of funds from the oil-consuming countries, a more basic concern is the capability of the major exporters of crude oil to achieve a continuing production target roughly doubling output every ten years to meet the required oil demand if present trend continues.

且不谈用油国的资金大量外流，更令人担心的重要问题是：如果目前的这种趋势继续发展下去，那么主要原油出口国是否有能力每 10 年大致将产量翻一番以满足对石油的需求。(apart from, “除了，且不说”。of...oil 作 capability 的定语，不定式短语 to achieve...continue 也作定语，修饰 capability。这个不定式短语中包含有：现在分词短语 roughly doubling...continue。这个短语中又包含有不定式短语作目的状语 to meet...continue 和 if 引导的条件状语，这两个状语都用来修饰 doubling。)

81. Television makes it possible for us to see a distant scene as a transmitter at the television studio telecasts the scene to our receiver.

当电视台的发射机把场景播送到我们的接收机时，电视就使我们能看到远处的场景。(it 是形式宾语，真正的宾语是 for us to see a distant scene。)

82. This failure of an object to regain its original size and shape as soon as the deforming force is removed is called elastic lag.

一旦形变力除去之后，物体不能恢复原来的大小和形状，这种现象称为弹性滞后。(failure 是名词，在句中作主语。不定式短语 to regain...shape 作 failure 定语。)

83. The purpose of this book is to introduce to the students solutions of problems having close

connection with application in industry.

本书的目的是向学生介绍一些习题的解法，这些习题与工业中的应用有着密切的关系。（不定式短语 to introduce...industry 是系词 is 的表语，用来揭示 purpose 的内容。）

84. It is clear that insulating materials should have such a high specific resistance as to be, to all intents and purposes, nonconductors of electricity.

显然，绝缘材料具有很高的电阻率，因而实际上是不导电的。（that 引出主语从句，it 是形式主语。such...as to be non-conductor... 表示结果。to all intents and purposes, “实际上”，“事实上”。）

85. The most probable explanation of radioactive disintegration is to be found in terms of the modern ideas concerning the structure of matter.

必须根据物质结构的现代观点才能更好地阐明放射性裂变现象。（is to be found 是复合谓语结构，有“应该”，“必须”的含义。in terms of, “根据”。concerning... 是介词短语，修饰 ideas。）

86. In solids the molecules are relatively close to each other and the forces of attraction are great enough to hold the molecules in a regular pattern and thus maintain a definite volume and shape.

在固体中，分子彼此结合得很紧密，分子引力大得足以使分子保持在有规则的结构中，从而使固体能维持一定的体积和形状。（to hold...and...maintain... 是不定式短语，起结果状语作用，说明 enough。）

87. It is impossible for a self-acting machine, unaided by any external agency, to convey heat from one body to another at a higher temperature.

不借助于任何外在因素，自动机不可能把热能从一个物体传递给另一个温度较高的物体。（不定式短语 to convey...temperature 在句中作主语，it 是形式主语，for...machine 是不定式 to convey 的逻辑主体。分词短语 unaided...agency 起状语作用，有条件的意味。）

88. The sun can be said to be the source of nearly all energy, and in the absence of the sun's heat and light, no life could exist on earth.

可以说太阳是几乎所有能量的来源，因此，如果没有太阳的光和热，地球上就不可能有生命。(to be the...energy 作 sun 的补足语。)

89. To appreciate the capabilities and limitations of radar, and so to be able to use it to full advantage, it is necessary to understand the character and behaviour of radio waves and to appreciate the principles of their generation and reception, including the presentation of echo to the observer

为了正确了解雷达的能力和局限性以便能充分地利用它，就有必要了解无线电波的特性和作用，而且要了解它的产生和接收的一些原理，包括对观察者所产生的回波。(To appreciate...radar 和 so to be able...advantage 都是目的状语。to understand...waves 和 to appreciate...observer 都是主语，it 为形式主语，代替这两个不定式短语。现在分词短语 including 为伴随状语，用来对上句谓语表示的行为进行补充说明。to full advantage, “充分地”。)

90. Pollution and waste combine to be a problem everyone can help to solve by cutting out unnecessary buying, excess consumption and careless disposal of the products we use in our daily lives.

这些污染物和废物结合在一起就会造成一大问题。每个人可以帮助解决这一问题：不去购买不必要的东西、削减过量的消费、不要粗枝大叶地处置日常生活中所使用的物品。(这是一个主从复合句。主句 Pollution...problem。everyone...daily lives 是省略 that 的定语从句，修饰 problem，that 在定语从句中作宾语时，可以省略。句中 Pollution 和 waste 是主语，谓语是 combine，不定式短语 to be a problem 为结果状语。we...use...lives 也是省略 that 的定语从句，修饰 products。)

91. Chemicals are made from the elements which have been put together in different forms to make wood or glass or rugs or water, or even the bones, blood, and muscles of our bodies.

化合物是由那些不同形式组合在一起而构成了木头、玻璃、毯子、水或者甚至我们身体的骨骼、血液和肌肉的元素组成的。(不定式短语 to make... 是结果状语，说明谓语 have been put。)

92. We notice that every day the sun appears to travel across the sky from east to west, but many people have not noticed that the stars also move across the sky in the same direction.

我们注意到，太阳每天看来是从东到西越过天空，但是很多人没有留意到星星也是沿着同样的方向越过天空的。(不定式短语 to travel... 是系词 appears 的表语。)

93. The invention of the thermometer, the barometer, and the hydrometer in the sixteenth and seventeenth centuries extended man's capability to observe, and sharpened his desire to interpret and to understand.

在 16 世纪和 17 世纪发明了温度计、气压计和比重计，这就扩大了人的观察能力，并加强了人们解释和认知（自然界）的愿望。（to observe 修饰 capability。to interpret and to understand 修饰 desire。）

94. Intelligent beings which are just beginning to develop on remote worlds may be ready to pick up our signals in thousands of years' time, or when life on earth has become extinct.

在遥远的星球上现在刚开始进化的有智慧的生物，也许要在千万年以后，即在地球上生物绝迹后，才能收到我们发出的信号。（ready 是形容词，不定式短语 to pick up... 作其状语。）

95. When the effect of inductance is such as to cause an induced voltage in the same circuit in which the changing current is flowing, the term self-induction is applied to the phenomenon.

当电感效应在变化的电流流过的同一电路里足以引起感应电压时，我们就用“自感”这个词来描述这一现象。（such as 引导的不定式短语 to cause... 表示结果。）

96. It was not until the 19th century, when magnetism was shown to be the product of electricity, that serious research into the nature of permanent magnetism began.

直到 19 世纪证明了磁是电产生的那个时候，人们才开始对永久磁性的本质作认真的研究。（to be the product... 为主语补足语，说明 magnetism。）

97. A rocket is independent of air because it contains an explosive mixture which consists both of a fuel to be burned and a supply of oxygen.

火箭飞行依赖空气，因为它本身装有爆炸混合物，这种混合物是由待燃烧的燃料和氧气组成的。（to be burned 在句中作定语修饰 fuel，有“将来”的含义。）

98. The first law of motion explains what is to be understood by force: it is that which tends to change the state of rest of a body, or of uniform motion in a straight line.

第一运动定律阐明了对力应该怎样理解：力就是改变物体的静止状态或匀速直线运动状态

的作用。(“be + 不定式”有情态动词的意思,即“可能”,“应该”,“必须”。)

99. In almost every cause the electric current that an ammeter measures must actually pass through the instrument, so this meter must be connected in series with the circuit in which it is to measure the current.

几乎在所有的情况下,安培计所测量的电流实际上必然要通过该电表,因此安培计必须与待测电流的电路串联在一起。(句中“be + 不定式”有表示“将要”的意思。)

100. Many of the applications of gases in engineering and industry depend on their chemical properties, that is to say, on their ability to be transformed or on their failure to be transformed, in particular reactions.

气体在工程和工业中的很多应用与气体的化学性质有关,也就是说,与这些气体在特定的化学反应中能否起化学变化的能力有关。(failure + 不定式,意为“不能……”。)

101. We also know from experience and observation that it takes a stronger push (by hand) to start an automobile to move than is required to start a scooter.

从经验和观察中我们也会知道:用手的推力启动一辆汽车比推动一辆摩托车要费更大的力气。(it 是形式主语, to start... to move 是真正主语。to start a scooter 在句中作目的状语。)

102. Though computers are capable of learning from their mistakes and improving on their performance, they need detailed instructions from human beings in order to be able to operate.

尽管计算机能从错误中吸取“教训”,从而改进其运算,但它们毕竟还需要人的详细指令才能工作。(in order to be... 表示目的。)

103. On account of its inertia a body requires a force to put it in motion, but once in motion a force is necessary to change either the magnitude or the direction of its velocity.

因为物体具有惯性,所以要使物体运动就必须有作用力,而物体一旦运动,要改变其运动速度的大小或方向也需要施加作用力。(on account of..., “因为”,“基于”。to put... 和 to change 均为目的状语,分别说明 requires 和 is necessary。)

104. A better way to see small objects is to use a double lens system like a telescope, but de-

signed for looking at small close objects instead of large distant objects.

观察微小物体的较好的方法就是利用像望远镜那样的双透镜系统，但这种透镜系统是为观察微小的近距离物体、而不是观察大的远距离物体而设计的。(to see small objects 作定语，修饰 way。is to use... 是系表结构。介词短语 like a telescope 作定语，修饰 system。but designed for... 是分词短语，也修饰 system。)

105. Any measurement or a set of measurements is necessarily inexact; it is a matter of the highest importance to know how to take a lot of necessarily discordant data, combine them in the best possible way, and produce in addition some useful estimate of the dependability of the results.

任何一次或一组测量未必是正确的。所以，十分重要的是了解如何选取一些必要的独立数据，然后用最好的办法把它们结合起来，并且要对其结果的可靠性作出某种有用的评估。(necessarily inexact = not necessarily exact, “未必是正确的”。it 是形式主语代替 to know...。how 引导三个不定式短语: to take..., (to) combine... and (to) produce..., 均作 to know 的宾语。)

106. It should here be pointed out that one of the most powerful trends in present-day science is for separate branches to converge and form inter-related groups of studies.

应当指出的是，近代科学重大的倾向之一就是单独分散的部门联合起来而形成有内部联系的研究团体。(is...to converge... 是系表结构，不定式短语用来指 one (trend) 的内容。for separate branches 是 to converge 的行为主体。)

107. A second future technique is to build spy satellites out of materials, like those in the “stealth” aircraft, that absorb or disguise radar waves, making them invisible to enemy equipment.

未来的第二种技术就是使用类似隐形飞机的材料来制造间谍卫星，因为这种材料能吸收或躲避雷达波，从而使敌方设施观察不到间谍卫星。(be + 不定式有“将来”之意。)

108. Natural science is by far the greatest movement in modern history, and the most important factor to be taken into account in political planning.

自然科学在近代历史中是最伟大的运动，同时也是政治规划中要考虑的最重要的因素。(by far, “非常”，“最”。take...into account, “考虑到”。to be taken into account 是不定式被动

语态，修饰 factor。)

109. Among the early Greeks, Aristotle was the first to watch living things and to try to classify them, to attempt to find out how life begins, and to write down his observations.

在早期的希腊人中，亚里士多德是第一个观察生物的，并试图探索生命是怎样起源的，而且把他所观察到的都记载下来。(在序数词前加定冠词 the，如 the first，使序数词名词化，其后可加不定式用作定语。)

110. The great practical value of electricity as a working agent lies in the fact that it is possible by different means, now to be studied, to maintain a continuous flow of electricity.

利用即将学习的各种不同方法，可以维持电力的持续流通，电作为动力的巨大实际价值就在于此。(that 引出同位语从句。now to be studied 是不定式被动态，作独立定语，修饰 means。)

111. He states the possible solution or solutions thus indicated as temporary, to be further tested by more observations or experiments or both.

他把这样表示的一个或几个可能的解答说成是暂时的，还有待于通过更多的观察或实验或者通过两者再进一步加以检验。(as temporary 是 state 要求的，作 solution or solutions 的宾语补足语。分词短语 thus indicated 和不定式短语 to be further...both 都作定语，修饰 solution or solutions。)

112. Science and technology have come to pervade every aspect of our lives and, as a result, society is changing at a speed which is quite unprecedented.

科学和技术已经普及到我们生活的各个方面，其结果是，我们的社会正以前所未有的速度变化着。(come + 不定式的结构表示目的、结果、开始，意思是“终于”、“开始”、“逐渐”等。)

113. The tendency of systems originally in mechanical equilibrium to change their states when placed in contact cannot be explained in terms of length, mass, and time alone.

原来处于力的平衡状态的系统，当它们相互接触时，就会有改变其原先状态的趋势，这种情况不能只根据长度、质量和时间来加以阐明。(to change their states 作定语，修饰 The tendency。)

dency。)

114. The sea covers seventy-one percent of the earth. There is still much to be discovered about this vast blanket of water.

海洋占整个地球面积的 71%。这片广阔浩瀚的水域中仍有许多奥秘有待人们去揭示。(much 是主语, to be discovered 是不定式被动态, 用来修饰主语 much。)

115. A few years ago the station was to be demolished, but because of its size and heavy brick construction, the usual methods of wrecking proved too costly.

几年前, 这个车站准备拆毁, 但因其面积大, 是沉重的砖结构, 常规的拆毁方法证明费用过大。(was to be demolished 是过去将来时。)

116. Great scientists of the past produced ideas which were the basis for great advances, but their ideas sometimes had to wait for years before they were understood sufficiently well to be of practical use.

过去的伟大科学家们所创立的思想为以后的巨大成就奠定了思想基础, 但是他们的思想有时要等多年以后才能被充分理解, 从而得到实际应用。(to be of... 是 sufficiently 要求的状语。)

117. In fact, scientists have estimated that the sudden reduction of this thick layer of air by as much as 10 percent would result in such far-reaching changes as to make human life eventually impossible.

实际上, 科学家已经作过估算, 如果这一厚层空气突然减少 10%, 就会引起各种深远的变化, 以致使人类最终不可能生存下去。(reduction...by as much as..., 介词 by 表示减少的数值。such...as to + 原形动词, “如此……以致于……”, 不定式作结果状语。)

118. In the subsequent chapter we will give some examples from the history of science to show how, as sciences develop, they proceed from having a large number of laws each applicable to a narrow range of phenomena to having a smaller number of more general laws that apply over a much broader range.

在下一章我们将举出一些科学史的例子来说明: 随着科学的发展, 科学从一开始拥有大量

的定律，但只适用于很窄的自然现象，后来拥有的定量数量少了，但它们应用的范围却很广。(from...science 作 examples 的定语。注意句中 to show...range 的不定式短语，它在句中作 will give 的目的状语。它包含的语法现象较为复杂。how 引导的是 to show 的宾语从句，直到句末。as...develop 是谓语 proceed 的时间状语从句。from having...phenomena, to having...range, 是 proceed 要求的, proceed from...to... “从……来，到……去”。each 是 laws 的同位语，指 laws 中之一。applicable to, “适用于”，是形容词短语，用来修饰 each。)

119. Our knowledge of the structure of the atom is very new, so new, in fact, that scientists realize that far more remains to be found out than has already been discovered.

我们对于原子结构的认识还是很生疏、很初步的，以致于科学家们认识到，事实上，有待人们去发现的未知领域远比已被发现的已知领域大得多。(remains 为系动词，to be found out 为 remains 表语，用来表明主语 far more 的内容。)

120. To understand and find the answers to all these questions, to develop the vast resources, or even to consider seriously the possibilities of climate control, it is necessary to study the ocean, the life within it, the air above it, and the bottom below it.

为了了解并寻找这些问题的答案，为了开发海洋的巨大资源，甚至为了认真考虑控制气候的可能性，就必须研究海洋、海洋里的生物、海洋上空的大气层和海底。(To understand...control 共有 4 个不定式短语均用作目的状语。)

121. The reader who peruses with some attention the following pages will have occasion to see that both operational and mental aspects of physics have their place, but that neither should be stressed to the exclusion of the other.

读者如果略微仔细地阅读以下几页就会有理由认为，实验操作和思维在物理学中都具有一定的地位，因而不能强调一方而忽略另一方。(who 引出的定语从句有条件的意味。have occasion + 不定式，“有理由……”。that...but that... 均为 to see 的宾语从句。neither, 代词，“两者都不”，“两者中任何一个都不”。to the exclusion of..., “把……除外”。)

122. Some measurements are direct, that is, they are made by comparing quantity to be measured directly with the unit of that kind, as when we find the length of a table by placing a yard or meter scale beside it.

有些测量是直接的，即把将要测量的量直接与这种量的单位加以比较。譬如，把码尺或米尺放在桌子边上即可测出桌子的长度。(to be measured 是不定式被动态作定语，有“将要”的含义。with the unit... 是 comparing 要求的。as, “譬如”。)

123. It is now possible to add or subtract two large numbers in one to two microseconds, and to multiply or divide them in ten to twenty microseconds, so that a computer can perform as much arithmetic in a quarter of an hour as an efficient clerk with pencil and paper might reasonably hope to achieve in a lifetime.

现在已经可以在 1~2 微秒内完成两个大数的加减，或在 10~20 微秒内完成这两个大数的乘除，所以一台计算机在 15 分钟里所完成的计算量相当于一个有经验的会计用笔和纸期望在一生中所完成的计算量。(it 为形式主语，代替两个不定式短语 to add or subtract... 和 to multiply or divide...。so that 引导结果状语从句。as much...as..., 第一个 as 是副词修饰 much, 第二个 as 是关系代词引导定语从句，as 在句中作 achieve 的宾语。注意，只有在 much 用作形容词时，as 才可用作关系代词，引导定语从句；much 用作副词时，则引出比较状语从句。例：The sun gives us as much energy every minute as mankind uses in a year. as...a year 是定语从句，as 用来代替 energy, 在从句中作 uses 的宾语。)

124. The first law of motion, in fact, explains what is to be understood by force: it is that which tends to change the state of a body, or of uniform motion in a straight line.

运动第一定律事实上说明了应当怎样来理解力：所谓力就是改变物体的状态，即改变物体匀速直线运动状态的一种作用。(what 引出宾语从句，what 是从句中的主语。“be + to be + 过去分词”这一结构有“应当”，“必须”的含义。)

125. To conclude, it seems clear that if we are to succeed in solving the many interrelated problems of underdevelopment, only the fullest and most intelligent use of the resources of all branches of science will enable us to do so.

最后，显而易见，如果我们要想成功地解决很多相互关联的不发达问题，只有最充分、最明智地利用所有科学部门的智力资源才能做到这一点。(are to succeed in... 表示将来想要实现的行为。)

126. As a result of two or three centuries of scientific investigation we have come to believe that

Nature is understandable in the sense that when we ask her questions by way of appropriate observations and experiment, she will answer truly and reward us with discoveries that endure.

由于两三个世纪以来科学研究所取得的成果，我们逐渐相信，如果运用适当的观察和实验的方法向大自然探讨问题，从这个意义上来说，她是可以被认识的，她会真诚地给我们答复，并且会不断地以新的发现来奖励我们。(in the sense that... 中，that 引导同位语从句，用来揭示 sense 的内容。come + 不定式的结构，表示目的、结果、开始，句中有“逐渐”之意。)

127. For the working engineering, technician, attempt is made in this volume to first establish a background by epitomizing the salient points in the development of electronic solid-state technology that leads up to present-day IC fabrication and commercial application.

在这一卷书中，试图首先概括一下促进了现代集成电路的制造和商业应用的固态电子技术发展中的一些要点，以便为从事实际工作的工程技术人员打下一个基础。(本句是主从复合句。介词短语 for the... technician 是不定式 to establish... 的目的状语。不定式短语 to establish a background... 作定语，修饰 attempt。介词短语 by epitomizing... technology 是 to establish... 的方式方法状语。that 引导定语从句，修饰 technology。IC = integrated circuit, “集成电路”。)

128. Matter appears to be granular in structure. When we look at a piece of iron, a drop of mercury, we may find it difficult to believe that each of these is made up of units or particles so small that they cannot be seen even with the aid of the most powerful microscope.

看来，物质似乎是呈粒状结构。当我们观察一块铁、一滴水银时，我们很难相信每一种物质都是由一些即使用高倍显微镜也看不见的小单元即小粒子组成的。(to be... structure 是系动词 appear 的表语。find it... 中的 it 是形式宾语，用来代替不定式短语 to believe...。so small that... 是形容词短语，说明 particles, that 引出的是结果状语从句。)

129. It is probably fairly generally accepted at present that, if the sound pressure level exceeds 85 decibels and the ear is to be subjected to noise at this level continuously, then protection of the ear to reduce sound pressure on it is necessary, if damage to the hearing is not to be suffered.

现在，人们可能普遍地接受这一观点：如果在声压级超过 85 分贝的情况下，耳朵就要持续受到这一级噪声的损伤，而要想使听力不受损害，就必须保护耳朵，以减小它所承受的声压。(在两个 if 条件从句中，is to be subjected 和 is not to be suffered 表示将来的一种可能情况。)

130. The implications of this line of reasoning are inescapable: the movement of traffic through the streets of a town cannot be understood without taking into account the activities which take place in the buildings which line them; to get at the roots of the traffic problem we must approach it through the social and economic factors which determine the ways in which activities and buildings are arranged in our towns.

这条推理思路的意图是最明显不过的：如果不把街道两旁建筑物中所发生的活动加以考虑，城市街道上的交通运行是无法理解的；为了了解交通问题的根源，我们必须通过社会和经济因素来研究交通问题。因为正是这些因素决定了我们城市中的各种活动和建筑物的安排方式。(cannot...without..., “如果没有……就不”。take...into account, “考虑”。line 是动词，作“排列成行”解。不定式短语 to get at the roots of..., “为了了解……根源”，为目的状语。which determine... 是定语从句，有原因状语从句的意味，可译为“因为……”。)

131. Most of the conclusions that we reach regarding the molecular nature of matter are the result of indirect observations, since the molecules are much too small to see and in all except a few experiments the effects of individual molecules are too small to observe.

我们关于物质分子的性质所得出的大部分结论是间接观察的结果，这是因为分子小得看不见，还因为除了几个实验以外，单个分子的效应在所有的实验中也小得观察不到。(conclusions 有两个说明语，一是 that 引导的定语从句，一是介词短语 regarding...。在这种情况下，定语从句一般要紧靠着被修饰的词。too + 形容词 + 动词不定式，“太……以致不……”。)

132. In order to make it easier to understand the way in which the magnetic field changes from point to point, it is convenient to draw certain lines which by their direction represent the direction of the magnetic field and by their number represent the intensity of the magnetic field.

为了更易于了解磁场的逐点变化情况：可以画一些线，由线的方向来表示磁场的方向，由线的数目来表示磁场强度，这样做是很简便的。(第一个 it 是形式宾语，代替不定式短语 to understand...point, easier 是 it 的补足语。第二个 it 是形式主语，代替不定式短语 to draw...。)

133. As the century developed, the increasing magnitude and complexity of the problems to be solved and the growing interconnection of different disciplines made it impossible, in many cases,

for the individual scientist to deal with the huge mass of new data, techniques and equipment that were required for carrying out research accurately and efficiently.

随着本世纪向前推移,有待解决的问题规模越来越大,越来越复杂,各个学科之间的相互联系也日益密切,这就使得科学家个人在多数情况下不可能应付在准确而有效地进行科学研究时所需要的浩瀚的新资料、新技术和设备问题。(to be solved 作定语修饰 problem 有将来之意。句中 made it, it 是形式宾语,真正的宾语是 to deal...efficiently。for the individual scientist 是 to deal with 的行为主体。)

134. The goal at which this book is aimed is to introduce the reader to the basic physical phenomena involved in transport processes in general and the transfer of heat and mass in particular, and to acquaint him with the laws and analytical methods which have been developed for their description.

本书旨在向读者介绍一些基本的物理现象,这些物理现象一般说来涉及传递过程,特别是涉及热传导和物质传递,同时,还向读者介绍一些定律以及为阐明这些定律所采用的一些分析方法。(句中主语是 goal,它有两个并列谓语,即 is to introduce 和 is to acquaint。acquaint...with...,“向……介绍”。be+不定式是系表关系。)

135. But even today, in spite of the high standard of living which has become general in the more fortunate West, the majority of people in the world still spend nearly all their time and energy in a near-ending struggle with nature to secure the food and shelter they need.

即使是今天,尽管在较幸运的西方,高标准生活水平已相当普遍,但世界上的大多数人仍然要花费几乎全部的时间和精力与大自然进行无休止的斗争,以便得到所需的食物和栖身之处。(to secure the food...need 是目的状语。they need 是省略 that 的定语从句。)

136. The history of science shows many instances in which the force of authority has operated in such a manner as to build up an exceedingly powerful resistance to further investigation; in some cases centuries elapsed before this resistance was eventually broken down, as happened in cosmology, for example.

科学史上有很多实例表明,权威的力量对进一步的研究工作构成巨大的阻力;在某些情况下,要经过几个世纪才能最终冲破这种阻力,例如在宇宙学方面就发生过这种情况。(such...as to...,“如此……以致”,表示结果。)

137. At the surface its temperature is about 6 000°C ; at the centre it is estimated to be about 40 million degrees. Yet as far as we can tell, the Sun is not being consumed by any sort of combustion.

太阳表面温度大约是 6 000°C；太阳中心的温度据估计为 4 000 万度。但据我们所知，太阳决不是正在由于某种燃烧而毁灭。（不定式短语 to be about...degrees 说明 it，是主语补足语。）

分词短语

分词是学习英语的难点之一，也是构成长难句的一个重要因素。学习分词时要建立几个正确的概念：

(1) 现在分词表示主动，过去分词表示被动。

例：All moving bodies have energy. (主动)

A lifted weight has energy. (被动)

(2) 现在分词要与动名词分开。从词形上看，它们都是相同的，只有从它们所起的作用才能区分开。分词用作定语、状语和补足语。动名词用作主语、宾语和表语。

(3) 怎样理解分词作状语时的“伴随行为”。

分词短语作状语时可用来自句中谓语所表示的行为或状态作进一步的说明。在这种情况下，分词所表示的行为或状态与谓语所表示的行为或状态同属于一个主体，即同一主语产生的两个不同的行为，或所处的两种不同的状态。谓语动词所表达的行为或状态为主，分词所表达的行为或状态为辅。分词的行为对谓语的行为作进一步的补充说明，使谓语的行为表达得更清楚、更具体。在时间上，分词的时态视谓语动词的时态而定：谓语动词是现在，分词时态即现在；谓语动词是过去，分词时态即过去。分词短语一般置于谓语动词之后，用逗号与句中其他成分隔开。这种“伴随行为”要比其他分词作状语时用得更多。“伴随”这一概念比较含混，不如“补充说明”清晰明白。例：

We cannot live without air for we breathe it continually, taking it into our bodies and blowing it out again through our noses and mouths.

没有空气我们就不能生存，因为我们要不断地呼吸，把空气吸入体内，又从口鼻呼出。

for 引导的状语从句中，从逻辑上看主语 We 有三个行为：一是 breathe，谓语所表达的行为是主要行为；二是 taking，三是 blowing，第二、第三分词所表达的行为是次要行为，它是用来对主要行为 breathe 作进一步补充说明，解释。所谓“呼吸”，“把空气吸入体内，又从口鼻呼出”就是“呼吸”。分词作状语时的“伴随”作用，实际上就是对谓语动词所表达的行为作进一步“补充说明”，使之更明白、更清晰。

(4) 分词独立结构：分词短语作状语时，它的逻辑主体就是句中的主语。

如：Lifting something, you do work. (你举起某物体时，你就是在做功。) 分词 Lifting 的

逻辑上的主体就是句中主语 you。但是如果分词短语中的逻辑主体与句中主语不一致时，分词短语就要有自己的逻辑主体。这种带逻辑主体的分词短语作状语时称为“分词独立结构”。这种结构在句中只起状语作用。可用来表示时间、原因、条件和补充说明等。例：

Aluminium being very soft, we can press it easily into any shapes desired.

铝很软，因此，我们能很容易地把它压成所要求的任意形状。(Aluminium...soft 不是句子，它是分词短语，分词短语中逻辑主体是 Aluminium，句中的主语是 we，这也是分词独立结构，在句中作原因状语。)

(5) 现在分词完成时态：现在分词的完成时态表示的动作发生在句子谓语动词所表示的动作之前。完成分词短语在句中只作时间状语，通常译为：“在……之后”。

如：Having taking the picture, the television camera turns it into electricity. 电视摄像机对一幅图像完成摄像之后，就把这一图像变成了电（信号）。

分词短语在句中分析与翻译的实例

138. Copper has less resistance than aluminium for the same size wire, but aluminium, being much lighter in weight, has less resistance per unit of weight.

对于同样粗细的电线来说，铜比铝的电阻小，但由于铝的重量很轻，所以单位重量的铝的电阻较小。(being...weight 是分词短语，在句中作状语，有原因的意味。)

139. According to Einstein's theory, one pound of any element or compound of elements, if completely turned into energy by breaking up the atoms, would release the same amount of heat as the burning of 1 500 000 tons of coal.

根据爱因斯坦的理论，任何 1 磅元素或元素的化合物，通过原子裂变如果都能完全变为能量，那么它们所释放出的热能相当于 150 万吨煤燃烧时所产生的热量。(if 引出的为分词短语作条件状语，条件状语的逻辑主体是 one pound...elements。)

140. Radio telescopes have one big advantage over conventional telescopes in that they can operate in all weather conditions and can pick up signals coming from very distant stars.

射电望远镜与普通望远镜相比有一个显著的优点，即它能全天候工作，并且能接收到从遥远的星体传来的信号。

141. The ultimate way to foster unpredictability is to be invisible – a top-secret endeavor being

hotly pursued by designers of military satellites.

逃遁的根本途径就是“隐形”——这是军事卫星设计师们正在孜孜以求的绝密目标。

142. We know that the Earth is a great sphere, spinning on its own axis and at the same time revolving round the Sun, the star nearest to it.

我们知道，地球是一个巨大的球体，它绕着自己的轴旋转，同时也绕着最近的恒星——太阳旋转。（分词短语 spinning... 和 revolving... 是独立定语，修饰 sphere。the star nearest to it 是 Sun 的同位语。）

143. Instead of adapting to a specific environment, man acquired the capacity to adapt himself to any specific environment, he spread throughout the globe, changing as he moved, until he became the most widely distributed species on earth.

人类不再是顺从环境，而是获得了一种能适应任何环境的能力。他们分散到全球各地，在迁移中人类在不断变化，直到成为地球上分布最广的动物。（instead of, “代替，而不”。changing as he moved 是现在分词短语作状语，是伴随动作，对谓语动词 spread 作补充说明。）

144. This alloy, being capable of withstanding strong stresses and high temperatures, is suitable for making the skin of an ultrasonic plane.

这种合金由于能经受强应力和耐高温，所以适用于制造超音速飞机的外壳。（现在分词短语 being... temperatures 在句中起原因状语作用。）

145. Cosmopolitan Shanghai was born to the world in 1842 when the British man-of-war Nemesis, slipping unnoticed into the mouth of the Yangtze River, reducing the Woosong Fort and took the city without a fight.

1842年，英国战舰尼米西斯号悄悄地潜入长江口，击毁吴淞要塞，不战而占领了上海，从此上海就变成了一座国际城市。（man-of-war, “军舰”。slipping... 和 reducing 两个现在分词短语作方式方法状语说明 took。when 从句中主语是 man-of-war Nemesis, 谓语是 took。）

146. In industrial countries the most important single event has been the realization and demonstration that pollution resulting from industry and agriculture is harmful to people and to the surroundings in which people live.

人们已认识并证实了，工业国家惟一的最重大的问题就是工农业污染对人类及其生存环境有害。(that 引导的是 realization 和 demonstration 的同位语从句。resulting from... 是分词短语作定语修饰 pollution。)

147. The tilt of the earth's axis never changes with regard to the stars, the north pole pointing always to the Pole Star, so that at two points in the earth's orbit, midway between the summer and winter positions, its axis is pointing neither towards nor away from the sun.

对恒星来说，地轴的倾斜度是永远不变的，北极总是指向北极星，所以在地球轨道的两点即夏季和冬季位置之间，地轴既不指向太阳也不背向太阳。(north pole pointing...Star 是分词独立结构，起状语作用，对 changes 进行补充说明。)

148. We can replace temperate trees, but the tropical rain forest is the unrepeatable climax of millenia of evolution, forming the most diverse assemblages of plant species and associated animal life which man will ever know.

温带森林我们可以再造，但是热带雨林却是经过数千年以上的进化形成，因而不能再造，因为它们形成了各种植物和相应的动物生活的多样性的群体。人们对此将有所认识。(forming...life 是现在分词短语作状语有“原因”的意味，它主要用来说明不能再造热带雨林的原因。ever 用于肯定句，表示将来发生的动作，起强调作用。例：If you are ever in the town you must visit us.)

149. Owing to the interdependence between pure and applied science, it is easy to see that this tendency, if extended too far, carries considerable dangers for the future of science – and not only pure science, but applied science as well.

由于理论科学与应用科学是互相依存的，人们不难看出，如果这种趋势继续发展下去，那么就会给科学的未来带来相当大的危害，不仅给理论科学带来危害，对应用科学也是一样。(if 引出的分词短语作条件状语，其主体是 tendency。)

150. Engineering is the profession in which a knowledge of mathematics and natural sciences gained by study, experience and practice is applied with judgement to develop ways to utilize, economically, the materials and forces of nature for the benefit of mankind.

工程技术是一种职业。在这门职业中，人们从学习、经验和实践中获得的有关数学和自然

科学的知识很有鉴别力地被用来开发各种途径，以经济地利用大自然的各种材料和天然动力来造福于人类。(gained by...practice 为过去分词短语是 knowledge 的定语。with judgement 作状语修饰 is applied。不定式短语 to develop mankind 作 is applied 的目的状语。不定式短语 to utilize...mankind 用作定语修饰 ways。for...mankind 作 to utilize 的目的状语。)

151. Given a certain power of engine, and consequently a certain fuel consumption, there is a practical limit to the total weight of aircraft that can be made to fly.

假如发动机的功率是一定的，燃料的消耗也是一定的，那么对能够使飞机飞行的总重量就要给予合乎实际的限制。(Given..., “在……情况下”，“如果有……”，“假定……”。例：Given good health, I hope to finish the work this year. Given good weather, our ship will reach the port on time. 这种结构通常在句子中作条件状语。)

152. In the present century the term “electron” has come to have a very special meaning, experiments having indicated that electricity, like matter, had an atomic character, too.

“电子”这个词在本世纪已经开始具有特殊的意义，实验早已表明：像物质一样，电也具有原子特性。(has come to have..., “已经开始具有……”，come + 不定式表示目的、结果、开始。experiments having indicated... 是分词独立结构，作补充说明。)

153. Superconductors eliminate all waste, making old uses of electricity more efficient and offering new uses that were impractical or impossible with ordinary conductors.

超导体却能杜绝一切浪费，使原有的电力用途效率更高，并且还能提供普通导体所不可能实现的新用途。(分词短语 making...conductors 作状语，对谓语的行为作补充说明。)

154. Flying at night, the pilot in an airplane equipped with radar can see on the radar viewing screen distant buildings, or perhaps a high mountain peak that is miles ahead.

夜间飞行时，驾驶着装有关雷达的飞机的飞行员，可在雷达的荧光屏上发现远处的建筑物，或前面数英里之外高耸的山峰。(Flying at night 为时间状语。)

155. In other words, 100 scientists of not too difficult disciplines operating, so to speak, under the same roof, make much more and faster progress than the same 100 people working separately and in isolation.

换言之，在一起工作的 100 名专业上不难共事的科学家，可以说要比同样是这 100 名科学家，但工作在分散的、相互隔离的环境中所取得的进步要大些，速度也快一些。（working...isolation 作定语修饰 people。）

156. Being under industrialized, the developing countries are largely dependent on imports to supply the equipment needed to produce the raw materials they export.

由于工业不发达，发展中国家在很大程度上要依赖进口设备才能生产供出口的原料。（Being... 在句中作原因状语。）

157. There is no method known to science today that can make it possible for us to magnify a drop of water enough to see one single atom – atoms are so very, very small.

今天的科学还不知道有什么方法能把一滴水放大到足以使我们能看到单个原子的程度，因为原子非常非常小。（过去分词短语 known...today 和 that 引出的定语从句都用来修饰主语 method。）

158. Nothing – education, home environment, other interests, wise discouragement – is likely to restrain the obsessed gambler and even when it is he alone who suffers the consequences, his diseases is a cruel one, resulting in a wasted, unhappy life.

教育、家庭环境、其他兴趣、明智的劝阻——任何东西都不能使赌徒们回心转意，正是他们自己饱尝苦果，这种疾病是残酷的，其后果是使他惨淡地虚度一生。（Nothing 是主语，谓语是 is。破折号之间的字用来对主语 nothing 的说明。it is...who 是强调句型，强调主语 he。resulting in “结果”，“终归”，“导致”，是现在分词短语，在句中作结果状语。）

159. By many careful experiments it has been found that any two different substances when rubbed together, or even when brought into close contact, become somewhat electrified.

通过多次仔细的实验已经发现，任意两个不同物体在一起摩擦时，甚至紧紧接触时，就会在某种程度上带电。（句中两个 when 均引出分词短语，作时间状语。）

160. An example is Aristotle who is often and incorrectly thought of as an opponent of the experimental method, giving as an argument for roundness the fact that during a lunar eclipse the earth casts a round shadow on the moon.

另一个例子就是亚里士多德，他经常被误认为是实验方法的反对派，作为地球是圆的论证，他指出这一事实：月蚀时，地球向月球投下一个圆形的影子。(be thought of as..., “被认为是...”。giving...moon 是现在分词短语用作伴随状语。the fact 是 giving 的直接宾语，as an argument for roundness 是 fact 的同位语。that 引导的是 fact 的同位语从句。)

161. Scientists use “gravitation” when speaking of the idea that every object in the universe attracts every other object; they use “gravity” when speaking of this attraction at the surface of the earth or other planets.

科学家们当谈到宇宙中的每一物体吸引任一其他物体时用“万有引力”；当谈到在地球或其他行星表面上的这种引力时则用“重力”。(when speaking of... 为分词短语，作时间状语。)

162. Having become more and more sophisticated, a robot can mimic man himself – even to the extent of being able to learn and remember its work assignments.

机器人已变得日益复杂了，它可以模拟人本身，甚至能够学会并记住分配给它的任务。(Having become... 是现在分词完成时态，它表示的行为发生在谓语动词即 can mimic 行为之前。)

163. The weight of any given body varies somewhat, depending on the latitude of the place where the observation is made, and on the distance of the body above or below the surface of the earth.

根据观测点的纬度的不同，根据物体在地面上下的距离的不同，任何一个已知物体的重量，多少都有一些变化。(分词短语 depending... 有条件状语的意味。)

164. Although some excellent books have appeared dealing with trees from selected regions of the world, and some books indeed dealing with trees in general, none, so far as I am aware, has covered the field so widely and in such depth as the present work.

尽管已经出版了一些很好的、涉及世界某些地区的树木学，也的确有几本普通树木学，但就我所知，没有一本能像本书这样广泛而深入地概括这学科领域的内容。(Although...general 为让步状语从句，主句 none...work。让步状语从句有两个并列分句，and some books 后省略了 have appeared。句中两个 books 各带有一个相同的分词短语 dealing with 作其定语。none 是主句中主语，谓语是 has covered。so far as I am aware 是插入句。)

165. It is now known that semiconductors have very few free electrons at low temperatures but that the number of these “conduction” electrons increase very rapidly at higher temperatures, thus reducing the resistance of the material.

现在大家都知道，在低温下半导体中几乎没有自由电子，但是在较高的温度下，这些“传导”的电子数迅速增加，从而降低了材料的电阻。（It 是形式主语，that 引出两个主语从句，用 but 连接起来。thus reducing...material 是分词短语，在句中作状语，有结果的意味。）

166. In general, the forces acting on a body vary in both magnitude and direction, resulting in complicated type of nonuniformly accelerated motion, which cannot be investigated in an elementary physics course.

通常，作用在物体上的力在大小和方向上都有变化，结果产生了一种复杂的非匀加速运动，这种运动不可能在初等物理教程中加以研究。（分词短语 acting on a body 作定语，修饰 forces。resulting in...motion 分词短语作状语，有结果意味。）

167. How do we get the satellite up to the required height? This is done with a series of rocket motors, each motor burning fuel so that the gases formed rush out with sufficient speed to push the rocket up.

我们怎样才能把卫星送到所要求的高度呢？这是由一系列火箭发动机来完成的。每一级发动机都燃烧燃料，以致所产生的气体能以足够的速度冲出，而将火箭推向高空。（each motor burning... 为分词独立结构，起补充说明作用。）

168. In the late nineteenth and early twentieth centuries, the atom, which had been accepted as indivisible was shown to have a complex structure of still smaller and more elementary units, arranged in the form of a miniature solar system.

19 世纪末 20 世纪初，曾被认为是不可分的原子，经证实是由更小、更基本的单元按微小的太阳系的模型排列起来的复杂结构。（arranged in...system 是分词构成的独立定语，修饰 structure。）

169. To solve all these problems the aircraft industry has a large number of research workers, with elaborate laboratories and test houses, and new materials to give the best strength in relation to

weight are constantly being tested.

为了解决上述的这些问题，飞机工业雇用大批研究人员，拥有设备完善的实验室和检测飞机馆。相对于重量而言，具有最佳强度的新材料在经常不断在试验。(To solve... 不定式短语作目的状语。with...houses 为介词短语作定语修饰 industry。to give...weight 为不定式短语作定语，修饰 materials。)

170. Having established the ampere as the unit of current, we may now use it to define the unit of quantity of electricity, or charge.

把安培定为电流单位之后，现在我们就可用它来确定电量即电荷的单位。(having established 是现在分词的完成时态，其短语在句中起时间状语作用。完成分词所表示的动作发生在句子谓语动词所表示的动作之前。)

171. Whether the job is a nuclear power station, an airport or a motorway, the great number and variety of tasks undertaken to complete the whole and labour and machinery to accomplish them have to be arranged to an elaborate timetable.

不论是兴建原子能电站、飞机场或是高速公路，承担整个工程所需的大量的各种各样的工作，以及完成这些工作的劳动力和机械都要根据精心制定的时间表来安排。(主句主语是 the great number and variety of tasks, labour 和 machinery, 谓语是 have to be arranged。过去分词短语 undertaken...the whole 作 tasks 的定语。不定式短语 to accomplish them 作 labour 和 machinery 的定语。)

172. Halley did not discover his comet: His contribution was to determine that comets do not travel straight lines or parabolic orbits, but in elliptical orbits, in a sort of squashed circle, thus making periodic visits to the inner solar system.

哈雷并未发现他的彗星：他的贡献在于断定彗星不是按直线或沿抛物线轨道运行，而是在椭圆形轨道上，即在一种扁圆形轨道上运行的，因而彗星周期性地到太阳系里遨游。(分词短语 thus making...system 作结果状语。)

173. Thursday September 29, 1988, the U. S. space shuttle Discovery blasted off from Kennedy Space Center in Florida, carrying Americans into space for the first time since the Challenger tragedy 32 months earlier.

1988年9月29日星期四，美国“发现号”航天飞机从佛罗里达州的肯尼迪航天中心起飞了。这是它在“挑战者号”遇难的32个月之后，第一次把美国人送往太空。（分词短语 *carry...earlier* 在句中起状语作用，对谓语 *blasted* 作补充说明。）

174. When arranged in proper geological order, fossils reveal how life has steadily developed from lowly-organized primeval creatures to the complex animals of today.

若把化石按正确的地质顺序排列，就能揭示出生命是如何从低等的原始生物逐步进化而演变成当今的高等动物的。（*when arranged...order* 是分词短语，在句中作时间状语。）

175. When we switch on a light we might be obtaining energy made from the chemical energy of coal, from the energy of flowing water, or even from an atomic energy power station.

当我们打开电灯时，我们就得到能量，这种能量或者来源于煤炭的化学能，或者来源于流水的能量，或者甚至来源于原子能电站。（*made from...station* 作定语用来修饰 *energy*。）

176. When a substance burns in oxygen or air, either it is oxidized completely, or some of its constituents are oxidized, the others not being affected.

当物质在氧气或空气中燃烧时，物质或者全部氧化，或者某些成分氧化，而其余成分则未受影响。（*the others not being affected* 是分词独立结构，在句中起补充说明作用。）

177. For this purpose large dams have to be built, often in previously remote wilderness areas of great beauty, necessitating major access road building, and drowning whole valleys and displacing the community that might have been settled there.

为了这个目的，常常在原先遥远荒凉但风景优美的地区，建起巨大的拦河坝，结果就必须建设主要的通路，淹没整个山谷，并且要迁走早已定居在那里的居民。（*often in...beauty* 是谓语 *have to be built* 的地点状语。三个现在分词短语：*necessitating...building*, *drowning...valleys* 和 *displacing...there* 有结果状语的意味。*might have been settled* 是虚拟语气，表示对过去某事的猜测。）

178. Some solid bodies have a tendency to maintain their shape, and when deformed by an external force, they return to their original shape as soon as the force is removed.

某些固态物体有一种保持原状的特性，当它们在外力作用下变形时，一旦去掉外力，就会

立即恢复原状。(when deformed...force 是分词短语, 在句中作时间状语。)

179. A man trying to see a single atom would be somewhat like a man trying to see a single drop of water in the ocean while flying many miles above it.

一个人试图看见单个原子, 就有点像一个人飞翔在几十英里的高空试图看到大海洋中的一滴水一样。(句中两个现在分词短语 trying... 用来分别说明 a man。while flying... 是分词短语作时间状语。)

180. Being high in computing speed and reliable in operation, the electronic computers have found wide application in computing and designing.

计算机由于计算速度快、运算可靠, 因而在计算和设计中获得了广泛的应用。(Being high...operation 分词短语作原因状语。)

181. Semiconductors are a group of materials which cannot be classified either as conductors or insulators, their conductivity lying between that of conductors and that of insulators.

半导体是一种既不属于导体也不属于绝缘体的材料, 它的导电性介于导体与绝缘体之间。(句中两个 that 均代替 conductivity。their conductivity lying... 是分词独立结构, 作状语, 对句子进行补充说明。)

182. Considering the present situation, it may cause surprise, in view of the large number of reports of resistance from so many important species all over the world, that the impact on insect control programmes is not more drastic.

考虑到目前的情况, 人们会感到奇怪, 鉴于从世界各地有大量的报告谈到有许多重要的物种出现了抗药性, 因此, 人们会感到控制害虫计划的影响并非那么显著。(considering...situation 是分词短语作时间状语。分词短语作状语时其行为主体应是句中主语, 但句中主语 it 代替 situation 不可能作 considering 的逻辑主体。在美语中, 如果泛指人们某种行为时, 可能采用这种用法。in view of, “由于”, “鉴于”, “考虑到”。与 so 相呼应, that 引导结果状语从句。)

183. If our Earth were seen from far away when flooded with sunlight, the land regions would appear brighter, and the watery regions darker.

如果在阳光普照下从很远的地方观看我们的地球，其陆地部分看起来就会很亮，而有水的地方则显得较暗。(when flooded... 是分词短语，在句中作时间状语。)

184. Pure aluminum has little use in industry because it is too soft for most application, but it is widely used as a base for alloys possessing good mechanical properties and very light weight.

纯铝在工业中没有多大用处，因为它太软，在大多数场合不太适用，但是铝作为一种基金属广泛地用来冶炼具有优良机械性能的轻合金。(现在分词短语 possessing...weight 用作定语修饰 alloys。)

185. We can imagine a time when laying down the necessary equipment for a guidance system will be part of the normal motorway construction work, just as railway tracks have been laid down in the past.

我们可以想像，有朝一日安装导航系统所必需的设备将成为通常快车道建设工程的一部分，就像过去铺设铁路轨道一样。(when laying...system 作定语修饰 time。time 在句中作主语，谓语是 will be。)

186. The progress of science depends upon many concerned with the application of the working laws of pure science to the practical affairs of life, and to increasing man's control over his environment, thus leading to the development of new technique, processes and machines.

应用科学则直接涉及把理论科学的作用定律应用于实际生活，并可用来提高人们对环境的控制能力，这样就促进了新技术、新工艺的发展和新机器的研制。(本句为简单句。the application of...to..., “把……应用于……”。分词短语 thus leading...machines 作状语，表示结果。)

187. Perhaps thousands of substances are known to be made of carbon in combination with hydrogen and oxygen, each having different properties from the others.

或许有成千上万种材料已知是由碳与氢氧化合而成的。每种材料都具有不同于其他材料的性质。(each having...others 是分词独立结构作状语，进行补充说明。)

188. Industry everywhere faced rising labour costs and more complex processes, both arising from the determination of human beings to achieve a better standard of living.

工业到处面临劳务费用的上涨，面临更为复杂的生产工艺规程，这两种情况都是由于人们决心要达到较好的生活水平而引起的。(both arising from...living 是分词独立结构，在句中作状语，对句中谓语 faced 作补充说明。to achieve... 为不定式短语，作 determination 的定语。)

189. Having found a general principle, we may reason forward from it and deduce other known or unknown facts. This process is called deduction.

在发现普遍原理之后，我们可进一步由此推理，从而推论出其他已知或未知的事实。这个过程称为演绎法。(Having...principle 是分词短语，起时间状语作用。having found 是现在分词的完成时态，它所表示的行为发生在句中谓语动词的行为之前。known, unknown 是过去分词，修饰 facts。)

190. Faced with such a situation it is obvious that we should search as widely as possible and with every available means for sources of fresh water that seem to be the least costly.

当面对这样形势时，显然，我们必须尽可能广泛地采取一切可能的手段来寻找费钱不多的淡水水源。(Faced with 为分词短语作时间状语。it 为形式主语代替 that 引导的定语从句。as widely as possible 和介词短语 with...costly 都是作状语，说明谓语动词 should search。that 引导的定语从句修饰 sources of fresh water。costly 是形容词。)

191. Light as well as heat increases the conductivity of semiconducting materials, this principle being used in creating photo resistance.

不仅是热，而且光也能提高半导体材料的电导率，制造光敏电阻就是应用这个原理。(as well as 用作并列连词时，强调的是前面的词；而汉语里“不仅……而且……”强调的是后面的词。例如，A as well as B... 应译为“不仅 B 而且 A...”。this principle...photo resistance 是分词独立结构，起补充说明作用。)

192. The devices of the ear-defenders can considerably reduce the sound pressure level on the ear, and from records taken over many months it was found that the personal efficiency of those wearing them had increased by 7.5per cent.

护耳装置能明显地降低噪声对耳朵的声压，从很多月份的记录中发现，戴护耳的 2 人的个人劳动效率提高了 7.5%。(分词短语 taken over many months 作定语修饰 records。)

193. In simple words, all this means that one pound of any element, if completely converted into energy by breaking up the atoms, would release the same amount of heat as the burning of 1 500 000 tons of coal.

简而言之，这就是说，如果通过分裂原子的方法使任何 1 磅元素全部转换成能量，那么该能量相当于 150 万吨煤燃烧时所产生的热量。(if...converted... 为分词短语作条件状语。)

194. Weight and mass are two different properties of matter, the first being determined by the gravitational attraction between the earth and the body, the second by the inertia of the body.

重量和质量是物质的两种不同的属性，重量决定于地球和物体之间的引力，而质量决定于物体的惯性。(the first being...the body 是分词独立结构；the second 后省略了 being determined, 也是分词独立结构，它们均对句子作补充说明。)

195. The railway of the future may well be the 'hovertrain', ridding on its air cushion over a single rail, which it never touches, at speeds up to 300 m. p. h. – the possibilities appear unlimited.

未来的铁路很可能是“气垫火车”，它依靠气垫在单轨上方行驶，不接触轨道，时速高达 300 英里——气垫船的前景是无量的。(分词短语 ridding on...rail 用作独立定语，修饰 hovertrain。)

196. Being a precise quantitative theory, it does not use phrases such as those just given, but calculates for any question under study the numerical probability that it is true.

由于它是一门精确的定量理论，所以它不能用上述的这些语句，而应为任何一个被研究的问题，计算正确程度的数量概率。(Being...theory 现在分词短语，用作原因状语，可译成“由于...”，通常位于句首。如：Being very small atoms cannot be seen by ordinary methods. 由于原子太小，用普通方法就不能看出它们。just given 过去分词短语作 those 的定语。for any...study 是 calculates 的目的状语，其宾语是 the numerical probability。that 引导的是 probability 的同位语从句。)

197. We must conclude from the work of those who have studied the origin of life, that, given a planet only approximately like our own, life is almost certain to start.

根据那些研究生命起源的科学家们的工作，我们必然会得出这样的结论：如果有一颗行星，只要与地球上的情况大致相仿，那么那里必然会有生命诞生。（句中 given 的意思是“假定有……”，“如果有……”，整个短语作条件状语。）

198. When we place the two together, some energy or heat is exchanged between the body and the thermometer, resulting in a slight change in the temperature of the body, and thus affecting the very quantity we wanted to measure.

当把某物体与温度计放在一起时，这两者之间就产生了某些能量交换即热交换，结果就引起了该物体的温度发生微小的变化。（resulting in... 和 thus affecting 这两个分词短语在句中均作结果状语。）

199. If you stood half a mile or so from a cliff, made a loud sound, and then accurately measured the time required for the sound to echo back, you could figure out to within a few feet how far away the cliff was.

如果你站在离峭壁半英里远左右的地方发出一个响亮的声音，然后准确地测出传来回声所需的时间，你就能计算出峭壁离你有多远，误差在几英尺之内。（required for...back 是过去分词短语作定语，修饰 the time。）

200. When starting breeding work to improve crop production, particularly of food crops, developing countries should follow simple and inexpensive methods which, in the great majority of cases, are economic and efficient.

在开展育种工作来改进作物特别是粮食作物的生产时，发展中国家应遵循这一原则：采用既简便又花钱少的方法，即在绝大多数情况下既经济又有效的方法。（when starting... 是现在分词短语，在句中作时间状语。）

201. The cost of electric power derived from water power does not differ much from that derived from coal by steam, for the cost of coal, in the latter case, offsets the greater investment required to develop water power and to transmit the electric power to the place of consumption.

水力发电的成本与烧煤用蒸汽发电的成本没有多大差别，因为在后一种情况下，煤的成本可与开展水力和把电输到用地的较大投资相互抵消。（过去分词短语 derived from...power 作 electric power 的定语。that 用来代替 the cost of electric power。过去分词短语 derived from

coal... 作 that 的定语。for 这里不是介词，而是连词作“因为”解。the cost 是主语，谓语是 offsets。required to...consumption 是过去分词短语，作 investment 的定语。介词短语 to the place... 作 transmit 的地点状语。)

202. These natural magnets have the property of attracting to themselves unmagnetized iron, the effect being most pronounced at certain regions of the magnet known as its poles.

这些天然磁铁具有吸引未磁化铁的性能，这种作用在磁铁的某些区域（称为磁极）表现得最为显著。（the effect being...poles 是分词独立结构，作状语，起附加说明作用。）

203. In carrying out this work, the pure scientist usually disregards its application to practical affairs, confining his attention to explanation of how and why events occur.

在进行理论研究时，理论科学家通常不去注意这些理论研究成果在实际中的应用，而是注意力集中于阐明事物发生的方式及其原因上。（分词短语 confining...occur 作状语对句子作补充说明。）

204. It is necessary to bear in mind that there are invariably political, educational, social and psychological obstacles which tend to interfere seriously with any measures taken to deal with the economic difficulties outlined above.

要记住，一定还存在着政治、教育、社会和心理方面的障碍，这些障碍往往会严重地干扰着为克服上述经济困难而采取的任何措施。（to bear...in mind “记住”，不定式作主语，it 是形式主语。that... 是 to bear 要求的宾语从句。take measure, “采取措施”；分词短语 taken...above 用来修饰 measures。分词短语 outlined above 用来修饰 difficulties。）

205. The psychiatrist dealing with mental breakdown, the educator moulding human development, the vocational counsellor advising on the choice of jobs, the social scientist studying the prevention of crime, the personal manager smoothing human relations in industry, the industrial psychologist streamlining industrial processes to suit the nature of human capacities; all these are concerned with psychology.

研究脑力衰竭的精神病专家、造就人才的教育家、对选择职业提出咨询的职业顾问、研究防止犯罪的社会学家、疏通企业内部人事关系的人事经理、使工业流程适应人能力特点的工业心理学家，所有这些都与心理学有着千丝万缕的联系。（该句有六个并列主语，the psychia-

trist, the educator, the counsellor, the scientist, the manager, the psychologist, all these 是总括词, 谓语是 are concerned。本句为简单句, 在每个主语的后面有一个分词短语作其定语。)

206. Thus we may be faced with a society having two basic groups in industrial organization: one consisting of those who understand, through their education and training, the complicated techniques necessary to control the complex industrial and organization environment that has developed; the other consisting of those who carry out the decision of this organizing group.

因而, 我们可能面对着在工业机构中两大基本集团社会: 第一, 这部分人通过所受的教育和培训而已经掌握了管理已经发展了的、复杂的工业和组织体系所必须的技能; 第二, 这部分人则执行上述组织集团的决策。(分词短语 having...organization 作 a society 的定语。冒号后有两个代词: one 和 the other 作 groups 的同位语, 对其具体说明。这两个代词后各有一个分词短语 consisting... 作其定语。one consisting... 和 the other consisting... 决不是分词独立结构, 因为分词独立结构主要功能是状语, 而不是定语。)

207. I do not see how a Marxist can accept as valid any question regarding the relative "importance" or "value" of human beings compared to any non-human entity, simply because young or old, skilled or unskilled, educated or not, they are of us and we are of them; for humans there can be no values higher than those of humanity.

我认为一个马克思主义者决不可把任何有关人的相对重要性或价值视为正确的问题与任何别的非人的实体作比较。因为不论人的年龄大小、技能优劣、受过教育与否, 我们是一个整体。因此, 对人类来说, 人的价值高于一切。(regarding... 为介词短语作定语修饰 question。compared to (with) 是过去分词短语作条件状语。higher than... 为形容词短语修饰 values。because 引导的从句中省略了 they are, they 代替 human beings。be of 其意为“具有”。如: The problem is of great importance。这问题具有重大意义。they are of us, 意为“他们中有我们”。)

动名词短语

在学习动名词时有四个值得我们注意的问题：

(1) 动名词与现在分词的区别。

动名词的形式和现在分词相同，它们之间的区别主要从它们的功能来看。动名词作主语、宾语和表语；分词用作定语、状语和补足语。

(2) 动名词的被动形式。

当动名词的逻辑主体是动名词动作对象时，该动名词通常用被动形式。如：

Some nations are trying to keep their river from being polluted. 一些国家正设法使河流免受污染。（河流是污染的对象，河流被污染。being polluted 是动名词被动态作介词 from 的宾语。）

(3) 动名词的完成式：动名词的完成式所表示的行为发生在谓语动词所表示的行为或状态之前。

When Columbus returned to Spain, he was highly honoured for having made great contribution to the country.

哥伦布回到西班牙时，由于他对这个国家做出了重大贡献，因而得到了很高的荣誉。（动名词完成式 having made... 是 for 的宾语，其行为发生在 was...honoured 之前。）

(4) 动名词的逻辑主体。

动名词短语前面加一个物主代词（如 my, your, his, its 等）、名词的所有格（如 work's）或名词的普通形式来表示这个动名词的逻辑主体。例如：

1) Do you mind my (his, her, our, their, John's) smoking?

你介意我（他，她，我们，他们和约翰）抽烟吗？（动名词 smoking 的逻辑主体就是 my (his, her, 或 John's)。）

2) We know of the earth behaving as a large magnet.

我们知道，地球相当于一个大磁体在活动。（动名词 behaving 作 of 的宾语，the earth 是 behaving 的逻辑主体。）

动名词短语在句中分析与翻译的实例

208. An observation is made of some phenomenon, one of nature's hard facts. A bird flying, a

bee collecting pollen, a man dying, these are facts.

观察就是观察某个现象，即自然界中某个客观的事实。鸟在飞行，蜜蜂采集花粉，人死亡，这些都是客观事实。（A bird, a bee, a man 分别为三个动名词 flying, collecting 和 dying 的逻辑主体。）

209. A more cautious approach is to think of computers as being useful in studying the mind in the same way that they are useful in studying the weather, economics or molecular biology.

更为谨慎的态度就是应该认为计算机在研究思维过程中是同样有用的工具，正像计算机在研究天气、经济或分子生物学时是有用的工具。（think of...as, “把……看作”，“认为……是”。being 是动名词，作介词 as 的宾语。useful 是形容词不能直接放在介词后作其宾语。由此可知，凡是形容词要想作介词的宾语，必须在形容词前加一个动名词 being。in such a way that..., “以相同的方式来...”，that 引导方式方法状语从句。）

210. Kinetic energy is the energy of motion; anything that is moving is capable of striking something else and exerting a force against it or doing work on it, or both.

动能是一种运动的能；任何运动中的物体都能撞击另一物体并对它施加力或做功，或者两者兼而有之。（striking...exerting... 和 doing... 三个动名词短语均作 of 的宾语。）

211. Now a vehicle has been invented that has neither wheels nor wings, but goes across water or land by being supported on a cushion of air formed by jets of air forced downward by vertical propellers.

现在发明了一种运输工具，既没有轮子，也没有机翼，而是由借助于竖式螺旋桨向下推进空气而形成的一层空气垫支撑着，在水上或陆上行驶。（动名词被动态 being supported 作 by 的宾语。）

212. Since one magnet exerts a force on another without their coming into contact, there must be a region of force around a magnet. This region of force is called a magnetic field.

既然一块磁铁无需接触另一磁铁即可对它施加作用力，因此在磁铁的周围必然存在着一个力场，这个力场称为磁场。（动名词短语 coming... 作 without 的宾语，逻辑主体 their 代替 magnet 和 another。）

213. In the course of manufacturing the article of plastics, the material from which it is made is capable of being made to flow, under the influence of heat and pressure.

在制造塑料制品的过程中，制品的原材料在热和压力的作用下能够流动。（manufacturing...plastics 为动名词短语，作 of 的宾语。being made 是动名词被动态，其短语作 of 的宾语。）

214. The position of a body at any instant is defined by its direction and distance from some other body which is usually conceived as being fixed, or at rest.

一个物体任意瞬时的位置是根据该物体至另一物体的方位和距离来确定的，而通常都把这一物体设想为固定的，即处于静止状态。（being fixed 是动名词被动态，作介词 as 的宾语。）

215. For military use, there may be submarines that can fly and then dive underwater to approach the battle area without being seen.

在军用方面，可能会出现一些既能飞行，接着又能在水下潜航的潜艇，它们能不被察觉就可进入战区。（being seen 是动词 see 的动名词被动形式，作介词 without 的宾语。）

216. The application of the principles of plant genetics and of the technical methods used in plant breeding to the needs of the developing countries starts off with the advantages of there being adequate labour and usually, land at the disposal of the breeder.

应用植物遗传学原理和植物育种技术以满足发展中国家的需要从一开始就具有有利的条件，因为那里有足够的劳动力，有可供育种者任意使用的足够土地。（application of...to..., “把……应用到”。本句为简单句，主语是 the application，谓语是 starts。there being 是 there be 的动名词，作介词 of 的宾语。at the disposal of, “由某人作主”，“由……来支配”，“供……使用”，作定语，修饰 land。）

217. These waterways make it possible for boats to travel between ports along the coast without being exposed to the dangers of the open sea.

这些航道使船只能往返于沿岸港口之间，这样就避开了公海上的危险。（being exposed to... 作 without 的宾语。）

218. The earth, in its travelling around the sun, meets many of these fragments, which enter

the atmosphere at a speed many times greater than that of a rifle bullet.

地球在环绕太阳运行时，会遇到许多这种碎片，它们以比步枪子弹还快许多倍的速度进入大气层。（travelling...sun 为动名词短语，是 in 的宾语，its 是动名词的逻辑主体，代替 earth。）

219. A body at rest is in stable equilibrium when on being slightly displaced, it tends to return to its equilibrium positions.

静止的物体处于稳定的平衡状态，该物体稍加移动时，它往往会返回到原来的平衡位置。（being displaced 是动名词被动态，作 on 的宾语，其逻辑主体是 body。）

220. On the moon, these fragments fall to the surface and so great is their number that the lunar explorers run a considerable risk of being hit.

在月球上，这些碎片会坠落在月球表面，其数量是如此之多，以致登月探险者要冒被击中的巨大危险。（being hit 是动名词被动态，作 of 的宾语。）

221. Atomic bombs and hydrogen bombs are rated megatons of TNT, referring to their having the energy equivalent of so many million tons of TNT.

原子弹与氢弹都是以百万吨梯恩梯计算的，这指的是它们具有的能量相当于多少百万吨梯恩梯。（TNT 是 trinitrotoluene 的缩写，三硝基甲苯，梯恩梯。having 是动名词，作 to 的宾语，their 代替 atomic bombs and hydrogen bombs，是 having 的逻辑主体。）

222. We have become so accustomed to being surrounded by air, which we cannot see, that we are often unaware of it at all.

我们已经如此习惯于我们周围的空气，空气又是看不见的，以致于常常察觉不到空气的存在。（being surrounded 是动名词被动态，作 to 的宾语。so...that 引出结果状语从句，“如此……以致于……”。）

223. Frequently, in elementary textbook, a metal is described as having a high lustre, good electrical and thermal conductivity, and as being malleable and ductile.

在基础教科书中，常把金属描述为具有很高的光泽、很好的导电及导热性能，又具有韧性和延展性。（having...conductivity 和 being...ductile 是两个动名词短语，均为介词 as 的宾语。）

224. A normal petrol engine has the advantages of being light and easily constructed, but its efficiency is only about 25%, that is, about one quarter of the energy from the petrol does useful work.

标准的汽油发动机具有重量轻、易于制造的优点，但它的效率仅约 25%，即汽油大约只有 1/4 的能量做了有效的功。（being 是动名词主动态，和动名词被动态 being...constructed 均为 of 的宾语。）

225. In short, an old system of agriculture, slowly or swiftly, is in the process of being destroyed by the advance of contemporary technology.

总而言之，旧的农业制度由于新技术的发展或快或慢地处于崩溃的过程中。（being destroyed 是动名词被动态作介词 of 的宾语。）

226. Iron has the property of rusting in moist air; water, the property of dissolving sugar; sugar, the property of being dissolved by water; glass, the properties of brittleness and transparency.

铁在潮湿空气中有生锈的特性；水有溶解糖的特性；糖有溶解于水的特性；玻璃具有脆性和透明性。（water, sugar, glass 这三个词后面都省略了 has。being dissolved 是动名词的被动式，作 of 的宾语。）

227. In spite of its being very useful a direct current system has one great disadvantage; namely, there is no easy, economical way in which one can increase or decrease voltage.

尽管直流电系统非常有用，但它有一大缺点，即没有一种既简易又经济的方法来提高或降低其电压。（being very useful 是动名词短语作 of 的宾语，its 是动名词的逻辑主体，它代替 system。）

228. It is assumed that every substance which is capable of being magnetized consists of a very large number of molecular magnets.

人们假定，能够被磁化的各种物质都是由大量的分子磁体组成的。（句中 which 用来代替 substance, which 是动词 magnetize 这一动作的对象，所以 magnetize 的动名词应该用被动形式。）

229. Nuclear fuel will be used in the reactor after its having been compressed into the form of rods.

核燃料被压成棒状之后，可用于反应堆中。（句中 having been compressed 是完成式被动态动名词，作 after 的宾语，其行为发生在谓语动词 will be used 之前，即先“压成棒状”，后“用于反应堆”。）

230. Carbon dioxide is continually entering the air as a result of burning and breathing, but it is also continually leaving the air by uniting with the rain, the oceans, the rocks, and the soil.

由于燃烧和呼吸作用，二氧化碳不断地进入空气，但由于与雨水、海洋、岩石和土壤的结合作用，二氧化碳又不断地从空气中排除。（entering 和 leaving 是现在分词，和 is 构成现在进行时。burning 和 breathing 都是动名词，作 as a result of 的宾语。动名词 uniting 作 by 的宾语。）

231. After having discovered the property of the atom, scientists began finding ways of using atomic energy for industrial purposes.

发现了原子的特性之后，科学家们开始寻找将原子能用于工业的途径。（动名词完成式 having discovered 是介词 after 的宾语，其行为发生在谓语动词 began 之前，即先“发现了原子的特性”，后“开始寻找”用于工业的途径。）

232. There have been three steps to the moon. The first step was taking a satellite out of Earth's gravity and into space. The second step was carrying men into space. The third step was travelling to the moon itself.

登月经历了三个步骤：第一步是使卫星脱离地球引力而进入太空；第二步是把人带入太空；第三步是登上月球。（句中 taking...、carrying... 和 travelling 均为表语。）

233. Crushing machines press the old objects built of valuable steel, copper and other materials into slabs no thicker than 18 inches which are then shredded before being fed into steel furnaces to begin the industrial cycle all over again.

轧碎机将用这些有用的钢、铜及其他材料制成的旧物品压成厚度不超过 18 英寸的板坯，然后将这种板坯切碎送进炼钢炉，又开始了它们的工业循环。（being fed 是动名词被动态，其短语作 before 的宾语。）

234. It is almost impossible to find a piece of iron that will not retain a little magnetism after being brought in contact with a magnet, although the amount retained is often very slight.

一块铁与磁铁接触之后，不可能不保留一点磁性，尽管这种剩余磁化的程度常常是很轻微的。(being brought 是动名词被动态，作 after 的宾语。不定式短语 to find... 在句中作主语，it 是形式主语。)

235. Electricity produced by water falling over a dam is energy from the sun because the sun's heat had to raise up the water by evaporation before it could fall back to the earth as rain and run down the rivers.

水通过水坝落差所发出的电是来自太阳的能量，因为先是太阳的热使水蒸发而升入天空，然后以雨水的形式降落到大地而流入江河。(falling over... 是 by 的宾语，water 是动名词 falling 的逻辑主体。)

236. Every change that takes place anywhere in the universe results either from energy being supplied from some source or in energy being given off.

宇宙各处所发生的任何变化，或是由于某一能源提供了能量造成的，或是这一变化导致了能量释放而引起的。(either...or 连接两个介词短语 from... 和 in..., 即 result from..., “起因于……”和 result in..., “导致……”，“结果形成……”。being supplied 是动名词被动态，作 from 的宾语，energy 是它的逻辑主体。being given 是动名词被动态，作介词 in 的宾语，energy 是它的逻辑主体。)

237. Improving the lubricant, introducing more perfect bearings and decreasing the resistance on the part of the medium in which the motion is taking place are means of bringing the efficiency nearer to 100%.

改进润滑油的质量、采用质量较好的轴承、减少机器运动接触部分的摩擦阻力，这都是促使机器的效率接近 100% 的措施。(句中有三个动名词短语作主语：Improving..., introducing... 和 decreasing...。)

238. Such activities as investigating the strength and uses of materials, extending the findings of pure mathematics to improve the sampling procedures used in agriculture or the social sciences,

and developing the potentialities of atomic energy, are all examples of the work of the applied scientist or technologist.

研究各种材料的强度及其用途, 推广理论数学的成果来改进农业或社会科学中所使用的取样程序以及挖掘原子能的潜力, 这一类活动都是应用科学工作者即工程技术人员所从事的工作的实例。(such...as..., “像……这样一类……”, as 后面引出三个动名词短语 investigating..., extending... 和 developing..., 都是 activities 的同位语。technologist 是 applied scientist 的同位语。)

239. After being launched onto the orbits in the universe satellites move steadily in the orbits until traces of gas and meteoric dust cause them to fall and burn up in the high atmosphere.

人造卫星在发射到宇宙轨道之后, 就会在轨道上稳定地运行, 直到微量气体和流星碎片引起卫星下落而在高空大气层中烧毁为止。(being launched 是动名词被动态, 作 after 的宾语。不定式短语 to fall...atmosphere 在句中作宾语 them 的补足语。until 是连词, “到……为止”。)

240. The value of radar lies not in being a substitute for the eye, but in doing what the eye cannot do.

雷达的价值并不在于能代替人的眼睛, 而在于能做人眼力所不及的工作。(being a substitute... 是动名词 + 名词结构。)

241. Every chemical change either results from energy being used to produce the change, or it causes energy to be given off in some form.

各种化学变化或者是利用了能量而产生的, 或者是这种变化使得能量以某种形式释放出来。(being used 是动名词被动态, 作 from 的宾语, energy 是动名词的逻辑主体。不定式短语 to be given...form 在句中作宾语补足语, 用来说明 energy。)

242. The plain has been chosen for the first station because of its being one of the places with the greatest amount of sunshine: it is recorded to get 2 600 hours of sunshine a year.

已经选定某平原来建造第一座太阳能电站, 因为这个平原是具有最大日照量的地区之一, 据记载, 该平原一年内日照时间达 2 600 小时。(its being... 是带有逻辑主体的动名词短语, 作 of 的宾语, its 代替 plain。不定式短语 to get...a year 在句中作主语, it 是形式主语。)

243. The suggestion has been made many times that we could solve the problem of automobiles polluting the air simply by substituting electric motors and storage batteries for the almost 100 million internal combustion engines in use today.

人们曾多次建议，只要用电动机和蓄电池代替今天使用的差不多一亿台内燃机，就可以解决汽车污染空气的问题。（automobiles polluting the air 是动名词短语，作 of 的宾语，automobiles 是动名词的逻辑主体。substituting...today 也是动名词短语，为 by 的宾语。）

244. It is interesting to note that the table exerts outward forces on the book and the earth by virtue of being slightly compressed by the pair of inward forces, which they exert on it.

值得注意的是，由于书本和地球对桌子轻微地施加一对向内的作用力，所以桌子对书本和地球也施加一对向外的作用力。（It is interesting to note that...，“值得注意的是”，“饶有趣味的是”，不定式短语 to note... 是真正主语，it 是形式主语，that 引出 to note 的宾语从句。by virtue of...，“由于”。being compressed 是动名词被动态，作 of 的宾语。which 引出非限定性定语从句，修饰 forces，其中 they 代替 the book and the earth，it 代替 the table。）

245. Hardness is the property of a metal which is to give it the ability to resist being permanently deformed when a load is applied.

硬度是金属的一种属性，当金属承受负荷时，它赋予金属一种抵抗永久变形的能力。（动名词 being deformed 在句中作 to resist 的宾语。）

246. Scientists working with the ocean are now wondering whether the ocean can go on being the wastebasket for these unsafe remains.

从事海洋研究的科学家现在都迫切地想知道，海洋是否能继续成为容纳这些危险的残余物的垃圾箱。（being...remains 是动名词短语，是 go on 的宾语。）

247. The property by virtue of which a body tends to remain in either of the natural states, and to resist being accelerated, is called inertia.

物体力图保持其惯常状态并抗拒被加速的特性称为惯性。（by virtue of...，“依靠……”，“由于”。being accelerated 是动名词被动态，作 to resist 的宾语。）

248. It was known to the Chinese as early as 121A.D. that an iron rod, after being brought near a natural magnet, would acquire and retain this property of the natural magnet.

中国人早在公元 121 年就已知道，铁杆在靠近天然磁铁之后就会得到并保持天然磁铁的这种性能。(being brought 是动名词被动语态，作介词 after 的宾语。)

249. There are two kinds of electric charge – that possessed by rubber after being rubbed with fur, called a negative charge, and that possessed by glass after being rubbed with silk, called a positive charge.

电荷有两种，与毛皮摩擦之后橡胶所带的电荷称为负电荷；与丝绸摩擦之后玻璃所带的电荷称为正电荷。(being rubbed 是动名词被动态，作介词 after 的宾语。)

形容词短语

英语中某些形容词后面要求有一定的介词或不定式与之连用，这样就形成了形容词短语。这种形容词短语作定语时，通常要放在被修饰的名词之后。这与分词短语、不定式短语和介词短语作定语时的情况一样，也是后置定语。

英语中常有下列形容词要求一定的介词构成形容词短语。

(一) 形容词 + 介词 at

angry, amazed, amused, annoyed, astonished, bad, competent, clever, disgusted, furious, good, indignant, mad, present, pleased, quick, slow, surprised, shocked, skilful 等。

(二) 形容词 + 介词 about

anxious, boastful, careless, certain, careful, confused, confident, crazy, curious, doubtful, dubious, enthusiastic, excited, grand, hopeful, keen, lazy, particular, serious, sensitive, worried 等。

(三) 形容词 + 介词 for

ambitious, anxious, adapted, available, conspicuous, convenient, eligible, eager, enough, fit, famous, good, grateful, hungry, late, noted, proper, responsible, ready, sorry, suitable, useless 等。

(四) 形容词 + 介词 from

absent, different, distant, distinct, distinguished, except, free, far, inseparable, recovery, remote, safe, separate 等。

(五) 形容词 + 介词 in

accurate, abstinate, absorbed, constant, confident, disappointed, expert, experienced, fortunate, happy, interested, lucky, rich, serious, slow, successful, weak, wise 等。

(六) 形容词 + 介词 to

analogous, available, close, equal, equivalent, essential, important, necessary, parallel, perpendicular, proportional, relative, similar 等。

英语中常有下列形容词要求不定式构成形容词短语。如：

able, angry, apt, clever, considerate, delighted, difficult, easy, eager, fit, free, glad,

happy, likely, lucky, quick, ready, relieved, sufficient, terrified, thoughtful, unable, urged, unfit 等。

注：上述形容词并不是每个都适合构成形容词短语。为了便于学习，把这些形容词归纳在一起。

形容词短语在句中分析与翻译的实例

250. Magnets have characteristics similar to electric charges in that like magnetic poles repel each other and unlike magnetic poles attract each other.

磁铁具有与电荷相似的特性：同磁极相斥，异磁极相吸。（similar to ... other 是形容词短语，用来修饰 characteristics。）

251. Suppose there were a machine free from any friction, then the work you put into the machine would be equal to that you get out of it.

假定一台机器没有任何摩擦力，那么你向这台机器输入的功就会等于从它那里得到的功。（free from ... 为形容词短语，用来修饰 a machine。）

252. As the bat flies along, it emits a continuous succession of supersonic squeaks, far too high for the human ear to pick up.

当蝙蝠向前飞行时，它发出一种连续不断的超声波，其频率极高，人的耳朵听不见。（far too high ... 非限定性形容词短语，作定语修饰 squeaks。）

253. The first thing which the designer will consider is that he should select an economical material as well as a process suitable for the product.

设计人员要考虑的第一件事就是：不仅应选择适合于产品的工艺规程，而且要选择经济的材料。（形容词短语 suitable ... product 作定语，修饰 process。as well as, “不仅……而且……”。）

254. We may find it difficult to believe that matter is made up of units or particles so small that they cannot be seen even with the aid of the most powerful microscope.

我们可能会感到难以置信，物质竟然都是由非常小的单元或粒子组成的，它们如此之小，甚至借助高倍显微镜都很难看得见。（so small that ... microscope 用来修饰 units or particles.）

255. It is marvelous that hydrogen and oxygen can combine in so close a union and form a compound so different from themselves as water.

氢和氧能化合得如此紧密，而形成像水这样与它们本身完全不同的化合物，这是令人惊奇的。(so different from ...为形容词短语修饰 a compound。)

256. Only a small percentage of them will have the educational background adequate to cope with the effective use of these new techniques, and we have too, the general problem of a low average level of education which prevents effective communication on this subject.

他们中只有很少一部分人受过有效地使用这种新技术的教育，而我们也遇到了一个普遍的问题，即平均教育水平比较低，因而妨碍了有效地传授这门学科。(形容词短语 adequate to cope with ...作 background 的定语。)

257. At a given depth the force exerted by a liquid is the same in all directions and acts always in a direction perpendicular to the surface against which it presses.

如深度不变，液体所施加的力在各个方向上是相同的，而且力的作用方向总是垂直于液体加压的表面。(perpendicular to ...presses 是形容词短语，说明 direction。against 是介词，“对着”。)

258. According to the Law of Conservation of Energy heat equivalent to that which is required to change a solid into liquid must be given out when the reverse change takes place.

根据能量守恒定律，液体变为固体时放出的热量必定等于该固体变为液体时所需的热量。(equivalent ...liquid 是形容词短语)

259. In many cases the proof of a law is indirect and consists in showing that all results deducible from such a law are consistent with observation and experiment.

在很多情况下定律的证明是间接的，其要点是：由该定律推导出的结论应与观察和实验结果一致。(deducible from such a law 是形容词短语，说明 results。)

260. As it is known to us, all matter is composed of molecules, and these molecules are particles so small that a thousand together could scarcely be seen with the best ordinary microscope.

正如我们所知，一切物质都是由分子组成的，这些分子是非常小的粒子，以致上千个分子

聚集在一起，用最好的普通显微镜也很难看得到。

261. Voltage is sometimes referred to as “electrical pressure” and compared to the pressure necessary to move water through the pipes of a water distribution system.

电压有时也称为“电的压力”，把它比作使水流经配水系统的管道所需的压力。(necessary to move ...system 是形容词短语，修饰 the pressure。)

262. Lower temperatures such as those found in deep mines and in many hot water wells, are not great enough to produce the high pressure steam necessary to power a generating plant.

在深矿井中和许多热水井中见到的蒸汽，温度较低，不能产生为发电厂提供动力所需的高压蒸汽。(necessary to power ...plant, 修饰 steam。)

263. Now we do not have the option of using a measuring device that produces an interaction smaller than the quantity to be measured, because we do not have a device that small.

现在我们不可能选用一种测量装置，它所产生的误差小于待测量的量，因为我们没有那么小的测量仪器。(smaller than... 是形容词短语，修饰 interaction。that small 是形容词短语，修饰 a device。that 是副词，修饰形容词 small。)

264. If there is anything truly speculative about the 1990s, it may not be what technology will bring – but rather how human beings will adapt to the most rapid change the species has ever experienced.

如果对于 90 年代真有什么问题可以推测的话，那可能并不是技术将会带来什么，而是人们将如何适应人类从未经历过的最快速的变化。(形容词短语 speculative ... 用来修饰主语 anything。)

265. In the soil a vast horde of microbes carry on a variety of actions and interactions, mostly chemical in nature, which make it possible for living things to exist on the earth.

土壤里有大群微生物在进行着各种各样的作用和相互作用，这些作用就其性质而言主要是化学作用，而正是这些作用使生物能够在地球上生存。(a horde of ..., “大群”。mostly chemical in nature 是非限定性的形容词短语，用来修饰 actions 和 interactions。it 是形式宾语，真正的宾语是带逻辑主体的不定式结构 “for living things to exist on the earth”。possible 是 it 的补足语。)

266. Long before we approach a computer as complex as our brain, we will perhaps build a computer that is at least complex enough to design another computer more complex than itself.

远在我们制造出像人脑那样复杂的计算机之前，我们多半会先制造出一种计算机，其复杂程度起码足以能设计出另一种比它自身更复杂的计算机。(more complex than itself 是形容词短语，修饰 computer。)

267. The fact that some bodies float on water and other liquids shows also that there exists a force acting against the lower surfaces sufficient to counteract their weight.

某些物体漂浮在水面上或其他液面上，这一现象也表明，存在着一个作用在物体底部表面的力，该力足以抵消物体的重量。(The fact that ..., that 引出的是同位语从句。there exists...属于 there be 的句型。这种句型都是倒装结构，主语是 force，谓语是 exists。分词短语 acting ...weight 作定语，修饰 force。sufficient ...weight 是形容词短语，也修饰 force。)

268. It was postulated in the early days of the subject that electricity was a fluid or rather two fluids, present in equal quantities inside matter and that charging a body consisted of adding an excess of positive or negative fluid to it.

在这门学科的发展早期曾经假设过：电流是一种流体，或确切地说是两股流体，这两股流体等量地存在于物体中，同时还假设，给物体充电就是给该物体加过量的正电流或负电流。(present ...matter 是形容词短语，但前面有逗号，因此是非限定性定语，修饰 two fluids。)

269. For very many years London has been a business centre with hotel accommodation mainly for visiting businessmen together with other well-to-do travellers and completely inadequate for the swarms of short-stay tourists landing at Heathrow or disembarking at Dover.

伦敦多年来一直是商业中心，它具有主要供来访商人和其他富裕旅客享用的宾馆设施，但根本不足以接待在希思罗机场着陆或在多佛港上岸作短期停留的众多游客。(with hotel ...travellers 为介词短语作定语修饰 centre。completely inadequate ...Dover 是形容词短语用来修饰 accommodation。and 用来连接 with 介词短语和 inadequate 形容词短语，都说明 centre。landing 是现在分词短语作定语修饰 tourists。)

270. An understanding of uses of electricity and magnetism is valuable to the worker in that it enables

him to use more effectively the manifold electrical devices now so vital to our efficiency and comfort.

了解电和磁的用途对于工人来说是很重要的，其重要性在于，这会使工人更有效地使用对我们的工作效率和舒适生活极为重要的各种电气设备。（that 引出的是介词 in 的宾语从句，在这一从句中，it 代替 understanding，不定式短语 to use ...devices 作宾语补足语。now so vital to ...comfort 是形容词短语，修饰 devices。）

271. If an external force does act upon a system of bodies, the momentum of the system is changed but, in the process, some other set of bodies must gain (or loss) an amount of momentum equal to that lost (or gained) by the system.

如—外力作用于某一物系，该物系的动量就会发生变化，但在这个过程中，另一物系必定会获得（或失去）一定量的动量，其大小等于前一物系失去（或得到）的动量。（does 用来加强谓语 act 的语气。equal to that ...system 是形容词短语，修饰 amount of momentum，that 是代词，代替 amount of momentum。过去分词 lost 引出的分词短语作定语，修饰 that。）

272. In only a minority of practical situations does the target of interest exist in isolation from other unwanted objects which may give rise to radar echoes capable of confusing or even obscuring the wanted-target echo.

只有在极少数情况下，注意的目标才不会受到其他背景目标的影响，这些无用背景所产生的雷达回波，可能混淆甚至会掩盖待测目标的回波。（主句是倒装句，主语是 target，谓语是 does exist。in isolation from ...，“与……隔绝”，即“不受……影响”之意。give rise to ...，“引起”，“导致”。capable of ...echo 是形容词短语，用来修饰 echoes。）

273. Another factor favourable to tourist development is the highly developed road network in Tunisia and the air and sea links which make contact with Europe and the rest of the world so easy.

有利于发展旅游业的另一个有利的因素就是突尼斯有高度发展的公路网，以及联系欧洲和世界各地极为方便的海运和空运。（favourable to ...development 为形容词短语作定语修饰 factor。主语 factor，系动词 is 有两个表语 network 和 links。so easy 是 contact 的宾语补足语。）

274. All of the problems are solvable, given enough time, interested men, and the funds necessary to carry out the research.

如果有足够的时间，有热心的人，再有进行此项研究所必需的基金，那么所有这些问题都可迎刃而解。(necessary to ... 形容词短语修饰 funds。)

275. A good way of ridding yourself of certain kinds of dogmatism is to become aware of opinions held in social circles different from your own.

使你自己摆脱某些教条的一种好方法，就是去了解与你自己处境不同的社会团体所持的见解。(different from your own 是形容词短语修饰 circles。)

276. When two or more materials are intermingled they may or may not enter into a chemical transformation that converts them into one or more other materials, distinct from those with which we started.

当两种或两种以上的物质混合在一起时，它们可能发生化学变化，也可能不发生化学变化。如发生化学变化，这些物质将变为一种或一种以上的与反应前不同的物质。(distinct ... started 是形容词短语，前面有逗号，是独立定语，对 materials 作补充说明。)

277. To launch a rocket into space at this speed (at a speed of seven miles per second) demands enormous power, and material strong enough to withstand the tremendous strains and the heat produced by friction as the rocket rushes through the air.

以这种速度（每秒7英里）将火箭发射到太空需要巨大的动力和强度极高的材料，如此高强的材料足以承受极大的压力和火箭冲过大气层时摩擦所产生的热。(strong ... the air 用来修饰 material)。

278. The introduction of the brain element into manufacturing is likely to increase the productivity per man to such an extent that we can look forward to an era where there should be a plentiful supply of goods and a reduction in the hours necessary to produce them.

在大规模生产中采用电脑，势必大大提高每个工人的劳动生产率，这就使我们能期待一个伟大时代的到来：商品供应极其丰富，生产商品所需工时大大缩短。(形容词短语 necessary to ... 修饰 hours。)

279. But many questions remain unanswered regarding the effect of irrigation and drainage on the quality of ground-water, and the possibility of maintaining the ground-water level below the

zone of the plant roots while bringing to the surface the water necessary for irrigation.

但是，关于灌溉和排水对地下水水质的影响，关于在抽取必需的灌溉用水后地下水水位仍保持在植物根区之下的可能性，诸如此类的很多问题仍未得到解答。（本句为简单句，主语是 questions，谓语是系动词 remain，表语是 unanswered。irrigation 是介词短语作 questions 定语。the effect of ... on, “对……影响”。maintaining ... below, “保持……在……之下”。介词短语作 level 的宾语补足语。while bringing ... 是分词短语作时间状语。necessary for irrigation 是形容词短语作 water 的定语。bringing the water to the surface; 因为 water 后有形容词短语，所以把 water 放后靠近形容词短语。）

280. But there is no method known to science today that can make it possible for us to magnify a drop of water enough to see one single atom – atoms are so very, very small.

但是，今天的科学界还不知道有什么方法使我们能够把一滴水放大到足以看清一个单个的原子，因为原子是非常小的。（it 是形式宾语，代替带逻辑主体的不定式短语 for us to magnify ...。possible 是宾语补足语。）

281. In industry, processing the information and designing the changes necessary to keep up with the market has meant the growing use of computers.

在工业方面，处理信息和制定必要的改革措施以适应市场的需求，意味着越来越多地使用计算机。（necessary to keep up ... market 是形容词短语，修饰 the changes。）

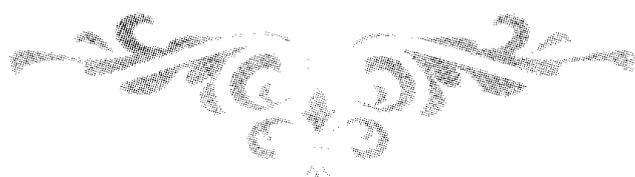
282. To conquer cosmic space man needed refined mathematical machines capable of solving highly involved engineering problem in split seconds.

为了征服宇宙空间，人们曾经需要一种能在一瞬间解决高度复杂工程问题的精密计算机。（不定式短语 To conquer ... space 是目的状语。形容词短语 capable of ... seconds 作定语修饰 machines。in split seconds, “一瞬间”。）

283. When you stand on the ground you are pushing down on it with a force equal to your weight, and at the same time the ground must be pushing up on you with exactly the same force.

当你站在地面上，你就给地面一个与你体重相等、方向朝下的推力；同时，地面必然会给你一个大小相等、方向向上的推力。

第二难点 补足语



补足语是英语语法中一个较复杂的语言现象，它表示了动词通过一定媒介与各词类之间的关系，如：动词与动词、动词与分词、动词与名词、动词与形容词、动词与介词、动词与副词的关系。在阅读中补足语出现的频率也很高，是阅读中难点之一。

(1) 宾语补足语与主语补足语。

在英语中，某些及物动词不仅需要宾语，而且还要求某个词或词组来补充说明宾语，即表示宾语代表的人或物所发出的动作或所处的状态，这个词或短语称为宾语补足语。有些语法书把宾语和补足语称为复合宾语。把带有宾语补足语的句子改为被动语态，则原来的宾语和宾语补足语就相应变为主语和主语补足语。例如：

I ask you to answer the question. (to answer the question 说明宾语 you，不定式为宾语补足语。)

You are asked to answer the question. (to answer the question 说明主语 you，不定式为主语补足语。)

(2) 动词不定式作补足语。

1) 带 to 的动词不定式：这类动词有：advise, allow, ask, cause, compel, consider, enable, encourage, expect, force, get, leave, order, permit, persuade, promise, request, require, teach, tell, want, warn, wish, consider, believe, feel, find, image, know, say, suppose, think, report 等用于被动态。seen, appear, happen, prove 用于主动态。

这类词可构成以下结构：

- be + -ed + to be + 名词
- be + -ed + to be + 形容词
- be + -ed + to be + 分词
- be + -ed + to be + 介词短语

2) 不带 to 的动词不定式：表示视觉、听觉和感觉的动词，如：see, watch, find, observe, notice, hear, listen to, feel, 此外还有 let, have, make。这种动词用于被动态时，还要带 to。

上述的视觉、听觉和感觉动词，外加 smell 和 see 可用现在分词作宾语补足语。

(3) 名词作补足语。

这类动名词有：call, name, elect, appoint, nominate, christen, crown 等。

(4) 由 as 引出的名词作补足语。

这类动词有：accept, classify, consider, define, describe, know, refer to, regard, state, take 等。

(5) 介词短语作补足语。

这类动词有: get, keep, make, protect, stop, set, prevent, free, put 等。

补足语在句中分析与翻译的实例

284. A volt is the amount of electrical pressure required to cause a flow of 1 ampere of electricity through a conductor that has 1 ohm of resistance.

使 1 安培电流通过具有 1 欧姆电阻的导体所需的电压量称为 1 伏特。(to cause ... through..., “使……通过……”。介词短语 through ... resistance 是宾语 flow 的补足语。)

285. Cigarette smoking is believed by most research workers in this field to be an important factor in the development of cancer of the lungs and cancer of the throat.

这个领域的大多数科学工作者认为, 抽烟是造成肺癌和喉癌的一个重要因素。(to be an important factor ... 是主语 smoking 的补足语。)

286. It is to be emphasized that a source of electricity current is simply a device for causing electricity to move around a circuit.

必须着重指出, 电源只不过是使电流沿着电路流动的一种装置。(it 是形式主语, 代替 that 引出的主语从句。不定式短语 to move ... 是宾语 electricity 的补足语。)

287. Anyone who has seen a great locomotive pulling a long train realizes that heat can do work, for it is the heat from burning fuel that makes the locomotive run.

任何人在看到巨大的火车头牵引着一长列火车时, 都会认识到是热能做功, 因为正是这种从燃烧的燃料中所产生的热能使火车头运动。(pulling ... 和 run 是 locomotive 的补足语。)

288. The cost of photovoltaic electricity could drop enough to make solar cells competitive with conventional sources of electrical power by the mid-1990s.

到 90 年代中期, 光电电力的成本将下降到足以使太阳能电池可与一般的电源相竞争的程度。(competitive ... power 是宾语 solar cells 的补足语。)

289. Much about sound is to be learnt from common observation, but if we experiment we can make our knowledge more precise and extensive.

从通常的观察中可以学到很多有关声音的知识，但是我们如果进行实验，就可以使我们的知识更为准确、更为广泛。（...precise and extensive 是宾语 knowledge 的补足语。）

290. Even a scientist who uses metric measurement all day in the laboratory may find it hard to get used to calculating the time it will take him to get home in the evening traffic in terms of kiloseconds rather than minutes.

甚至整天在实验室里使用米制计量的科学家，到了傍晚，他也很不习惯用千秒而不用分钟来计算他乘车回家所需的时间。（不定式短语 to get used ...minutes 作 find 的宾语，it 为形式宾语。hard 为宾语补足语。get used to + 名词，意为“习惯于”。it will take ...minutes 是 that 的定语从句，修饰 time。that 在句中作 take 的宾语。in terms of，“根据”，“按照”，“以……来表示”。）

291. It is this special ability that will one day make helicopters a particular cheap form of transport, because all the expense involved in laying down roads or railways is avoided.

正是由于这一特殊性能，将来总有一天会使直升飞机成为一种特别经济的交通工具，因为铺设道路或铁路的一切费用都省掉了。（a ...form of ...是 helicopters 的补足语。）

292. Just as the moon is held tightly in the gravitation of the earth, and always keeps the same face turned towards us, so Mercury is tightly bound to the sun and the same face is always exposed to the sun's burning rays.

水星被太阳紧紧地吸引着，总是以同一面暴露在炽热的阳光下，犹如月亮被地球的引力紧紧吸引住，而总是以同一面朝着我们那样。（turned ...us 是宾语 face 的补足语。）

293. One day, it is said, while Newton was sitting in the garden, wondering about the force that kept the moon moving around the earth, he saw an apple fall from a tree. This made him wonder why it did that.

据说，有一天，当牛顿坐在花园里正在思考着是什么力使月球总是围绕地球运转时，他看到一只苹果从树上落下来。这使他感到惊奇，为什么苹果会这样呢？（moving ...earth 是宾语 moon 的补足语。）

294. There exists a pull between the earth and the moon, which keeps the moon travelling in

its orbit around our planet, the earth.

地球和月球之间存在着引力，这种引力使月球在围绕着我们这个行星即地球的轨道上运行。(travelling in ...是宾语 the moon 的补足语。)

295. A radical departure from A-bombs and H-bombs are a new generation of nuclear weapons that focus the power of nuclear explosions, rather than letting the force escape in all directions.

新一代核武器与原子弹、氢弹的根本区别是：新的核武器集中核爆炸的威力，而不是让它四处扩散。(不带 to 的不定式短语 escape ...是 the force 的宾语补足语。)

296. If after a body is deformed by some force, it returns to its original shape or size after removal of the force, the material is said to be elastic.

如果某一物体在力的作用下产生变形，去除作用力之后，又能恢复原来的形状和大小，那么这物体就称为弹性物体。(to be elastic 是主语 the material 的补足语。)

297. In the office or at home, various kinds of strange machines would be a part of our life, we would find it hard to live without these machines.

在办公室或在家里，各式各样新奇的机器会成为我们生活的一个组成部分，如果没有这些机器，我们会觉得难以生活。(it 是形式宾语，真正宾语是 to live ...machines。hard 是 it 的宾语补足语。)

298. We now know that the temperature must be kept constant, or, in other words, the expansion and contraction of a gas must be an isothermal one.

现在我们知道，温度必须保持不变，换言之，气体的膨胀和收缩必须是等温的。(constant 是形容词，是主语 temperature 的补足语。)

299. He tried to discover how it was that an industrial system which created great wealth nevertheless forced nearly one-third of the population of the richest city in the world to live in a state of chronic want.

他试图揭示出创造了巨大财富的工业体制是怎样迫使世界上最富裕城市中近 1/3 的居民生活在长期贫困之中。(how 引导的是 discover 的宾语从句。句中 it 为形式主语，代替 that 引导的主语从句。was 是谓语，how 是 was 的表语。that 引导的主语从句中，system 是主语，

forced 是谓语。不定式短语 to live ... want 是 forced 要求的宾语补足语。)

300. The author enumerates some of the factors which make it difficult for the sociologist to conduct experiments in the same way as his colleagues in the physical sciences.

作者列举了某些主要原因，使社会科学家难于像他的自然科学家同事那样以同样的方式进行科学实验。(difficult 是形式宾语 it 的补足语，it 代替带有逻辑主体的不定式短语 for ... to conduct ...。)

301. We might thus define chemical changes as those that result in the formation of new substances and involve changes in the composition of the substance.

因而我们可以把能引起新物质的形成并能引起物质成分改变的那种变化定义为化学变化。(define sth ... as ..., “把……定义为”。as those ... 为 changes 的宾语补足语。)

302. Materials such as uranium and titanium do not exist in large quantities but they possess unusual properties which make them essential for certain highly specialized uses.

铀和钛这样一类材料并不大量存在，但它们具有非凡的特性，这使得它们成为某些特殊用途所不可缺少的材料。(essential for ... uses 是宾语 them 的补足语。them 代替 Materials。)

303. Not only can temperature and light affect the conductivity, but also the addition of impurities to semiconductors will make it change greatly.

不仅温度和光能够影响其导电性，而且半导体中加一些杂质也会使导电性发生很大变化。(change 是不带 to 的不定式作宾语 it 的补足语，it 代替 the conductivity。)

304. The falling of an apple to the ground set Newton wondering why it moved towards the earth, and not upwards into the sky.

苹果落到地上使牛顿感到奇怪，为什么苹果向着地球运动而不飞向天空呢？(wondering ... sky 是宾语 Newton 的补足语。)

305. Petroleum is believed to be produced naturally from dead animal and vegetable matter at the bottom of shallow seas and swamps.

人们认为，石油是由在浅海和沼泽底部死亡的动植物天然形成的。(to be produced ...

swamps 是主语 Petroleum 的补足语。)

306. If it turns out to be technically and economically sound, the laser might prove to be a major breakthrough in telephone communications.

如果激光在技术上和经济上都表明是切实可行的，它在电话通信中就会证明是一项重大的突破。(to be a ...breakthrough in ...是主语 the laser 的补足语；to be ...sound 是主语 it 的补足语。)

307. If a factory closes down because it cannot meet government pollution standards, a large number of workers suddenly find themselves without jobs.

如果一个工厂由于不符合政府的控制污染标准而倒闭，大量的工人就会突然失业。(without jobs 是 themselves 的宾语补足语。)

308. Thus electricity is seen to be a form of energy by which power may be taken up at one place and very rapidly – and generally very efficiently – delivered at another.

于是，电可看做能量的一种形式，可把动力以这种形式迅速地——而且通常是高效率地——由一个地方输送到另一个地方。(to be a form of energy ...是主语 electricity 的补足语。which 引出的定语从句中有两个谓语：may be taken up, may be delivered。)

309. The body is said to have been positively charged if the flow of electrons had been from the Earth to the body, and negatively charged if the flow had been from the body to the Earth.

如果电子从地球向某物体流动，就说该物体已带有正电；如果电子由某物体向地球流动，就说该物体已带有负电。(to have been charged 是不定式完成时的被动态，作主语 body 的补足语。)

310. The fact that the basic carrier wave is of such high frequency will permit a single laser beam to carry a great deal of information.

基本载波具有如此高频率的这一事实，使得单个激光束可以携带大量的信息。(不定式短语 to carry ...information 作宾语 laser beam 的补足语。)

311. Only a few years ago, scientists had very vague ideas about electricity. Many of them

thought of it as a sort of “fluid” that flowed through wires as water flows through pipes, but they could not understand what made it flow.

仅在若干年以前，科学家们对于电的概念还是很模糊的。许多人认为它就像水流过管道那样，是一种沿着电线流动的“流体”，但他们并不了解是什么东西在使它流动。（as a sort ... 是宾语 it 的补足语。it 代替 electricity。）

312. The satellites have made it possible for people in different continents to see the same television programs at the same time, and easier for them to talk to each other over their telephones.

卫星已经使各大洲的人们能在同一时间里看到同一电视节目，此外，他们还能很方便地通过电话彼此交谈。（it 是形式宾语，代替不定式短语 to see ... 和 to talk ... for people ...，和 for them 是两个不定式的行为主体。possible 和 easier 分别为 it 的补足语。）

313. Today many parents who were not able to attend college when they were young have the satisfaction of seeing their sons and daughters attend.

今天，年轻时没有上过大学的父母为能看到自己的子女进入大学而感到欣慰。（句中 attend 是 sons and daughters 的补足语。）

314. The discovery of radar, the sending out of sound-waves and judging the obstacles ahead by the returning echo, made some investigators wonder if this was not the system used by bats.

雷达的显示类似于发出声波并按回声来判断前方的障碍物，使得一些研究人员想到这是蝙蝠使用的系统。（the sending ... echo 是 radar 的同位语，它用来揭示 radar 概念的内涵。wonder 是 investigators 的宾语补足语。）

315. Some families would be delighted, no doubt, to have a robot slave doing all the downstairs housework after they were in bed at night, while others would prefer to have it done in the morning, but this would be entirely a matter of choice.

有些家庭无疑乐于让机器人在他们夜间入睡后在楼下做各种家务，而另一些家庭则宁愿让这些家务在早上完成，这完全是各自选择的问题。（句中 doing ... at night 是宾语 a robot slave 的补足语，done in the morning 是宾语 it 的补足语，it 代替 housework。）

316. In some cases, it has been found more economical to have the powerhouses located near

the center of consumption and supply them with oil and gas fuel by pipe lines, than to have the powerhouses at the oil field or gas field and send the electric energy over long transmission lines.

业已发现的事实是，在一些情况下，把电厂建在用电中心附近，用管道供给它油和天然气燃料，比起把电厂建在油田或天然气产地而用输电线远距离送电要经济得多。(to have ... and (to) supply ... lines 是真正主语，it 是形式主语。more economical ... than ... 是主语 (it) 的补足语。过去分词短语 located ... consumption 是 powerhouses 的宾语补足语。at the oil field or gas field 是 powerhouses 的宾语补足语。这两个补足语都是 have 要求的。)

317. Scientists have already found problems to be associated with living in the ocean are nearly the same as those of living in outer space.

科学家们业已发现，与人类在海洋中生活有关的各种问题，和在外层空间生活所遇到的问题几乎是相同的。(to be associated ... 是宾语 problems 的补足语。)

318. A body that produces its own light waves, like the sun or an electric bulb, is said to be luminous, while a body that reflects light, such as the moon, is said to be illuminated.

能产生自己光波的物体，像太阳或电灯，叫做“发光体”；而反射光的物体，如月亮，则称为“受照体”。(to be illuminated 是主语 a body 的补足语，that 代替 a body。)

319. An alternative the study group found worth considering was the use of concentrators, optical devices that collect sunlight and focus it onto the surface of solar cells.

该研究小组认为值得考虑的可供选择的方案就是利用聚能器，它是一种光学装置，能够收集阳光并把阳光聚焦在太阳能电池的表面上。(the study group found worth considering 是省略关联词的定语从句，其中 worth considering 是省略了关联词的宾语补足语。optical devices 是 concentrators 的同位语。)

320. By the end of the 90s, we may well encounter tiny robots cooking hamburgers in fast-food restaurants, mopping up shopping malls, even delivering meal trays in hospitals.

到 90 年代末，我们很可能会见到微型机器人在快餐店里做汉堡包，在购物中心擦地，甚至在医院里送饭。(cooking, mopping, delivering 都是 robots 的补足语。)

321. In some circumstances, a person in a space capsule can be in a situation when he experi-

ences no pull in any direction and in this state he is said to be weightless.

在某种情况下，宇宙飞船密封舱中的人可能处于各个方向都感受不到引力的状态中，这时就可说他处于失重状态。(to be weightless 是主语 he 的补足语。)

322. When water is used for cooling the machinery in a large factory, it is ordinarily used only once, and then allowed to run into a common sewer with all the waste material from the factory.

在大工厂里，用于冷却机器的水通常只用一次，便任其排入普通的下水道，随污水带走工厂的所有废弃物。(to run into ... 是主语 it 的补足语，it 代替 water。)

323. While sitting under an apple tree, Newton saw an apple fall to the ground. This set him thinking about the force that pulled the apple to the ground and the force that kept the moon in its orbit.

当牛顿坐在苹果树下时，他看到一只苹果落到地上，这使牛顿反复思索把苹果拉向地面的力，思索把月球保持在其轨道上的力。(分词没有自己的独立时间，它是由句中谓语的时态确定的。句中谓语 saw 是过去时，sitting 显然也是过去时。由 while 引出的分词短语作时间状语。fall to..., in its orbit 分别是 apple 和 the moon 的宾语补足语。)

324. The utility of a machine is chiefly that it enables a person to perform some desirable work by changing the amount, the direction, or the point of application of the force.

机器的效用主要是通过改变力的大小、方向或着力点来使人得以完成某种要做的工作。(不定式短语 to perform ... force 是宾语 person 的补足语。)

325. If the molecules in a cubic inch of air could suddenly be made as large as fine grains of sand, they would fill a trench three feet deep and a mile wide extending from San Francisco to New York.

如果 1 立方英寸空气里的分子都能突然变得像细砂粒一样大，这些砂子就能把一条从旧金山到纽约的 3 英尺深、1 英里宽的大沟填满。(as large as ... 是主语 the molecules 的补足语。)

326. Though Verrazano is by no means considered to be a great explorer, his name will probably remain immortal, for on November 21st, 1964, the greatest bridge in the world was named after him.

虽然弗拉查诺还称不上一个伟大的探险家，但他的名字可能会流芳百世，因为在 1964 年 11 月 21 日，人们以他的名字命名了世界上最大的桥梁。(to be a ... explorer 是主语 Verrazano 的补足语。)

327. Even if scientists develop new ways of feeding the human race, the crowded conditions on the earth will make it necessary for us to look for open space somewhere else.

即使科学家们开拓新的途径给人类提供食物，但地球上这种拥挤的状况使我们有必要在地球之外某个地方寻找一个开阔的空间。(it 是形式宾语，真正的宾语是带逻辑主体的不定式短语 for us to look for ... else, necessary 是宾语补足语。)

328. Although man has been growing mentally richer ever since he started to think, the electronic computer allows and will continue to allow him to perform tremendous "mental" tasks in a relatively short time.

虽然人从开始思维以来在智力上不断增长，不断丰富，但计算机正在并将继续使人有可能在相对短的时间去完成巨大的“智力”任务。(has been growing 是现在完成进行时，表示行为从过去某一时刻开始，一直延续到现在，可能再进行下去。to perform ... 是 him 的补足语。)

329. A feature of modern industrial society is the amount of time which must be spent in education in order to enable person to equip him or herself with the skills necessary for employment within the complex technological and social systems that characterise this society.

现代工业社会的特点就是必须在教育上投入大量时间，以便使人们能学到在当前复杂的技术和社会体制中就业所必需的技能，因为这些复杂的体制正是现代社会的特征。(to equip ... this society 不定式短语是 enable 要求的宾语补足语。necessary for ... this society 是形容词短语作定语，修饰 skills。)

330. Visitors to China can still see the Great Wall running like a snake across the country and can still walk along the top.

到中国的游人仍然可以看见长城如长蛇一般穿过这个国家，仍然可以在上面漫步。(running like ... country 是 the Great Wall 的补足语。)

331. If we should ever have an occasion to check the accuracy of one of our better measuring

tools, we might have this check made against one of the prototype bars at the National Bureau of Standards.

如果我们能有机会检测一下我们的一种较精密的量具的精度，我们可以对照着国家标准局的原器规来进行这种检测。（过去分词短语 made against ... 是宾语 this check 的补足语。）

332. Direct distance dialing is not only fast and convenient for the caller, it has also enabled telephone companies to handle the extraordinary growth of telephone use that has occurred since the 1950s.

长途电话直接拨号不仅快速方便，它也使电话公司能应付 50 年代以来出现的电话业务飞速发展的趋势。（to handle ... 作 companies 的补足语。）

333. The explosion of technology is already freeing vast numbers of people from their traditional bondage to nature, and now at last we have it in our power to free mankind once and for all from the fear which is based on want.

技术的迅猛发展正在使大批人从传统的大自然束缚中解放出来，而我们现在终于有能力使人类彻底摆脱对贫困的恐惧。（have sb or sth in our power, “使……处于……状态”。in our power 是 it 的宾语补足语。）

334. Gravitational effect takes place over immense distances; thus the force of attraction which the sun exerts on the earth causes the earth to describe an orbit round the sun.

万有引力效应可以延伸到极大的距离，因而太阳对地球的引力使得地球绕着太阳沿轨道运行。（take place, “发生”。不定式短语 to describe ... sun 作宾语 earth 的补足语。describe, “沿着……运行”。）

335. Astronomers no longer regard as fanciful the idea that they may one day pick up signals which have been sent by intelligent beings on other worlds.

将来有朝一日，天文学家们可能会接收到有智慧的外星人发出的信号，这种想法现在天文学家们不再认为是荒诞无稽的了。（regard sth as ..., “把……视为……”。as fanciful 是宾语 the idea 的补足语。）

336. To many people who have no knowledge of radar the idea of sending out wireless waves,

making them , so to speak, bounce off a distant aeroplane and return to their starting point is utterly uncanny.

对于缺少雷达知识的大多数人来说，把无线电波发射到遥远的飞机上，然后使其返回起点这一概念，可以说是完全不可思议的。（不带 to 的不定式短语 bounce off ... 和 return to ... 都是 them 的宾语补足语。）

337. Since the human mind is the only thinking thing that scientists know, it isn't surprising that researchers have tried to use the human thought process as a model ever since the days of the first "electronic brain" – the room-sized computers of the late 1940s.

由于人的大脑是科学家迄今所知惟一能思维的器官，因此，从第一代“电脑”即 40 年代后期像房间那么大的计算机问世以来，研究人员一直把人的思维过程作为模式来研究，这就不足为奇了。（use sth ... as ..., “把……用作”。as a model 是 process 的宾语补足语。）

338. High rents, high rates of interest and low prices have the mass of petty peasant producers with very little to invest in the development of the land, and keep them at the mercy of the more powerful people in the village.

抬高田租、高利盘剥以及低价收购，使广大贫农无法投资改善耕作，使他们继续听任当地有权势的人摆布。（have 在这里是使动词，with ... 为 the mass 的宾语补足语。keep 与 have 是并列谓语，at the mercy of, “听任……的摆布”是 them 宾语补足语。）

339. Not only has the use of computers saved a great deal of mental effort but it also resulted in calculations being carried out in a very much shorter time.

使用计算机不仅节省大量的脑力劳动，而且也能使计算在很短的时间内完成。（Not only 在句首时，主谓语的次序一般要颠倒。句中 use 是主语，谓语是 has saved。being carried out 是现在分词被动态，作宾语 calculations 的补足语。）

340. Even being good at getting other people to fight for you and telling them how to do it most efficiently – this, after all, is what conquerors and generals have done – is not being civilized.

即使你善于驱使别人为你打仗，并指令他们怎样打得最有效——这毕竟是征服者和将军们的所作所为——这可不是文明行为。（to fight ... 是宾语 people 的补足语。）

341. If you break your arm or leg, the doctor will probably send you to hospital to have an X-ray photograph taken to find out just where the break is and what kind of break it is.

如果你跌断了手臂或腿，医生很可能把你送到医院去照一张 X 光照片看看骨折在哪一部位，是什么性质的骨折。（过去分词 taken 是宾语 photograph 的补足语。）

342. If we were to return to the age of Newton, we should find ourselves faced with the greatest obstacles in trying to make people understand our recent scientific advances, and we should probably find ourselves accused of witchcraft if we persisted in our ideas.

假如我们回到牛顿那个时代，我们就会发现，要使那时的人们理解我们今天的科学进步是极为困难的，如果我们要坚持我们的意见，也许就会被指控为玩弄巫术。（过去分词短语 faced with ... 是宾语 ourselves 的补足语。不带 to 的不定式 understand ... advances 是宾语 people 的补足语。过去分词短语 accused of ... 是 ourselves 的补足语。）

343. The next two decades could see per capita income increasing by \$ 10 to \$ 20 in the more developed countries for every \$ 1 it increases in the less developed ones.

在今后 20 年内，可以看到，不发达国家中人均收入每增加 1 美元，发达国家每人就要增加 10~20 美元。（see sb or sth ... doing, “看……在做什么”。increasing ... 作 income 的宾语补足语。）

344. If we sprinkle a fine powder into some water and then study it under a microscope, we see the particles of powder being pushed about by the molecules of water.

如果我们把细粉末撒到水里，然后在显微镜下观察，就可以看到粉末的粒子在水分子的作用下向四周扩散。（being pushed 是现在分词被动态，它所引导的短语作宾语 particles 的补足语。）

345. Where there are torrential rains, houses are either built on piles to keep them off the ground, or they have steep thatched roofs to drain off the rain.

在有暴雨的地方，房屋或者建造在木桩上使其离开地面，或者有用茅草盖的陡峭的屋顶，使雨水迅速流掉。（off the ground 是 them 的补足语。）

346. Scientists probing further and further into the secrets of nature find magnetism to be important everywhere, whether it be within the extremely small nucleus of an atom or in the vast distances of the astronomical universe.

在不断深入探索大自然的奥秘时，科学家们发现，不论是在微小的原子核内，还是在遥远的宇宙天体中，磁力都是十分重要的。(to be important 是宾语 magnetism 的补足语。)

347. Water is considered to be of high quality and drinkable if it has no more than 500 parts minerals, or salts, per one million parts of water.

如果水中所含矿物质或盐分不超过 5‰，那就被认为是高质量和可饮用的水。(to be of ... drinkable 是主语 water 的补足语。)

348. Such problems have stumped researchers at Yale and other schools, as they try to get computers to perform simple language translations.

当耶鲁大学和其他学校的研究人员试图让计算机作简单的语言翻译时，他们却被这类问题难住了。(get sth ... to do ..., “让……做……”。to perform ... 是 computers 的宾语补足语。)

349. We can see that, though we must keep as much dust as we can out of our houses, yet dust has a very important part to play in the work of nature.

我们可以看到，虽然我们的住房必须尽可能地防止灰尘，然而灰尘在自然界却起着非常重要的作用。(out of ... houses 是 dust 的补足语。)

350. Using the same idea – having a computer guide the laser beam's path – makes it possible to create a new generation of machine tools for the industries and factories of the future.

利用同样的设想，即让计算机来控制激光束的光路，就有可能制成供今后工业部门和工厂使用的新一代机床。(不带 to 的不定式短语 guide ... path 用作宾语 a computer 的补足语。)

351. When windmills were invented in the twelfth century, they had to be turned by hand to keep them pointing into the wind, in order to keep them working.

在 12 世纪发明风车时，为了保持运转，必须用手转动风车使之迎着风向。(keep + 宾语 + 现在分词，“保持……”，“使……继续……”。现在分词在这种结构中作宾语补足语，如本句中

的 pointing 和 working 都是宾语补足语。)

352. These experiments depend on having atoms going with enormous speeds, speeds so great that a single one of these atoms has energy enough to produce observable effects.

这些实验依赖于使原子以极高的速度运动，其速度要高得使单个原子所具有的能量足以产生显著的作用。(have + 宾语 + 补足语，“使……怎么样”。分词 going 是宾语 atoms 的补足语。enough ... effects 是形容词短语，作定语修饰 energy。)

353. There is nothing obvious about the appearance of an element which makes it different from other substances, and this explains why man took so long to discover the building blocks from which his world is made.

一种元素在外表上往往没有什么显著的特点令其与其他物质区别开来，这说明了人们为什么花了那么长的时间，才发现了构成人类世界的基本单元。(different from ... 是 it 的补足语，it 代替 an element。)

第三难点 代 词



代词在阅读过程中是难点之一。在英语中，为了语言的精练，避免重复，除了采用“省略”手段外，还广泛地用代词来代替上下文中已经出现过的词或提到的内容。在阅读过程中必须根据上下文的逻辑关系正确判断代词所代替的具体内容，如分析不当，往往会产生“张冠李戴”的错误。必须指出的是，在各种代词中 it 的用法最为复杂，it 用作形式主语或形式宾语时，只有语法意义而没有词汇意义，可以说是“虚”的。但用作代词时，代替某一词或某一具体内容，可以说是“实”的。it 在句中表现得“真真假假，虚虚实实”，这给阅读理解造成了很大困难，必须认真分析和辨别。

为了语言精练，避免重复的目的，除了采用省略和代词外，还采用另一种手段——近义词（带定冠词 the 的近义词）来替代上文中已出现过的词，这种近义词可称为“替换词”。

英语中常见的代词有：one (ones), that, they, those, the former, the latter 等。it 的用法较为复杂，特别加以归纳。

it 的用法

(1) it 作无人称代词：it 作无人称代词表示自然现象、气候、时间、距离等。it 是形式主语没有词汇意义。如：

- 1) It is very cold today. (气候)
- 2) It is three o'clock. (时间)
- 3) It is a long way from here. (距离)

(2) it 作人称代词：it 作人称代词时，用来代替上下文中提到的事或物，有时可代替整个句子的内容。

(3) It is (was) + 形容词 + 不定式 (to do), it 为形式主语，不定式短语为真正主语。

(4) It is + $\left. \begin{array}{l} \text{过去分词} \\ \text{形容词} \\ \text{名词} \end{array} \right\} + \text{that (what, how, whether ...)}, \text{it 为形式主语, that 引导的为}$

主语从句。

(5) It + 不及物谓动词 + that 引导的主语从句。这些动词有：seem, appear, turn out, follow, happen 等。

(6) It may well be that 引导的主语从句。

(7) it 作形式宾语：

- 1) 某些及物动词 + it + 形容词 + 不定式；
- 2) 某些及物动词 + it + 形容词 + that ...。

在上述两种句型中，it 是形式宾语，真正的宾语是不定式短语，或 that 引导的宾语从句。

(8) it 用于强调句型：

It is (was) + 被强调的成分 + that (which, who)

强调句型是简单句，可以用来强调句中主语、宾语和状语，但不能强调定语和谓语。在这种句型中把 It is ...that 去掉，句子仍成立。

代词在句中分析与翻译的实例

354. All the various transitions from one form of motion into another are governed by one of the fundamental laws of nature, that of the eternity of matter and its motion.

运动可以由一种形式变为另一种形式，所有运动形式的变换都取决于一个基本的自然规律，即物质及其运动永恒性的规律。(that 代替 one, one 代替 law。)

355. The author enumerate some of the factors which make it difficult for the sociologist to conduct experiments in the same way as his colleagues in the physical sciences.

作者列举了某些使社会科学家难以进行实验的因素，而在同样的情况下，他的自然科学的同事们却可以进行实验。(it 为形式宾语代替真正宾语 to conduct ...。)

356. The metallurgist has recently found a metal skin for missiles and supersonic planes, one that will retain its strength at the high temperature caused by air friction.

冶金学家最近发明了一种用于导弹和超音速飞机的金属外壳，这种外壳在大气摩擦引起的高温下仍然能保持其强度。(one 作同位语，代替 skin。)

357. If one can scale down all dimensions to, let us say, one tenth, the average lengths of the current-paths will be reduced to one tenth. And the speed of operation will be scaled up 10 times.

如果人们能把所有尺寸缩小，比如说，减小到原来的 1/10，那么电流路径的平均长度也将减小到 1/10，操作速度因而就会按比例提高 10 倍。(one 泛指人。)

358. Underground water reserves are much larger than those on the surface, but as they are unseen we tend to underestimate them.

地下水的储量要比地面水大得多，但是由于看不到，所以往往低估了地下水的储量。(those 代替 reserves。as 引导原因状语从句。them 代替 reserves。)

359. Here we find that the term work has been given by science a somewhat more limited meaning than that to which we have been accustomed.

这里我们发现，科学赋予“功”这个词的含义比我们所习惯的“工作”这个词的含义多少要狭窄一些。（第一个 that 是连词，引导宾语从句。第二个 that 是代词，代替 work。）

360. We know that air can be compressed, and it is reasonable to suppose that the air at the surface of the earth is compressed by the weight of all the air on top of it.

我们知道空气是可以压缩的，因而我们有理由假设：地球表面的空气受到该空气层上部所有空气重量的压缩。（第一个 it 是形式主语，代替不定式短语 to suppose ...。句末的 it 是人称代词，代替“地球表面上的空气”。）

361. It follows from the principle of relativity that Newton's second law of motion, although fundamental in classical mechanics, only has an approximate and by no means complete validity.

由相对论原理可知，牛顿运动第二定律尽管是古典力学中的基本原理，但只是近似的，而决不是完全正确的。（It follows from ...that ..., “由……可以得出……”。It 是形式主语，代替 that 引出的主语从句。）

362. It was supposed that bodies fall to the ground with a speed which is proportional to their weight. This means that if bodies of 100 pounds and 1 pound are pushed over a cliff, the former falls 100 times as fast as the latter.

曾经有人设想，物体落地的速度与其重量成正比，这就意味着，如果把重 100 磅的物体和重 1 磅的物体从悬崖上推下去，前者下落速度是后者的 100 倍。（the former 指 bodies of 100 pounds, the latter 指 bodies of 1 pound。）

363. Even though the same computer might have performed the same operation millions of times in succession, it must still be told exactly how to do that operation every time it repeats it.

即使同一台计算机很可能已经连续完成同样的运算达数百万次之多，但每当它重复这一运算时都得准确地告诉它如何去完成这一运算。（句中有三个 it，第一和第二个 it 都代替计算机，第三个 it 代替 operation。might have performed 是虚拟语气，表示对过去发生事情的猜测。every time 是连词，引导时间状语从句。that 在句中不是连词，是指代词，作 operation 的定语。）

364. However, while the moon is so far from earth that it takes it a month to revolve around the earth, man-made satellites, which are closer to the earth, can make a complete revolution in a few hours.

但是，月球由于离地球太远，绕地球旋转一周需要一个月时间，而人造卫星离地球较近，在数小时之内就能绕地球旋转一周。（第一个 it 是形式主语，代替 to revolve ...，第二个 it 代替 moon。）

365. It is said that metals are indispensable to our modern civilization, but it may surprise you to know that many metals were used by man as early as 1 000 B.C.

一般认为金属对我们的现代文明社会来说是不可缺少的，但是早在公元前 1 000 年人类就使用了多种金属，了解这一点会使你感到惊奇。（两个 it 都是形式主语，第一个 it 代替 that 引导的主语从句，第二个 it 代替不定式短语 to know ...。B.C. 是 Before Christ 的缩写，“公元前”。）

366. We shall learn how it is that Nature holds the soil on the slopes – the wonderful soil which it takes her so long a time to make and which is the source of all our wealth.

我们将了解到大自然是怎样保持坡地上这块极好的国土的，大自然经历了漫长的岁月才创造出这样的国土，它是我们一切财富的源泉。（how 引出的是宾语从句，it is that 用来强调 how。which it takes ... 中 which 是 to make 的宾语，it 是形式主语，代替 to make。）

367. All sciences follow the scientific method, a process for organizing and using the knowledge we already have so that we can predict and explain new facts about the behavior of nature.

所有的学科都要遵循科学方法，即这样一种方法：把已有的知识系统化并加以利用，以便我们能预测和解释大自然变化过程中的新事实。（从语法结构上来看，process 是 method 的同位语，所以它的词汇意思是“方法”而不是“过程”。因此 process 也可看成是 method 的替代词。）

368. And since the speed of light is about a million times as great as that of sound waves, the reflection of light waves may very well be applied in detecting a target and its range.

光速大约为声速的 100 万倍，因而光波的反射现象可以有效地用来探测目标及其距离。

(that 代替 the speed.)

369. But now hundreds of ships of all nations are fitted with an electrical device which makes it possible to record continuously the depth of water over which the ship is moving.

但是现在世界各国数以千计的船只都装配有一台电子装置，船只在航行时，这种装置能不断地把船下面的海水深度记录下来。(it 是形式宾语代替 to record ...moving.)

370. To understand the operation of the transistor – how it is that current can flow in a piece of solid crystal in such a way as to result in amplification – it is necessary to start with the atomic structure of the crystal.

为了了解晶体管的工作原理——即要弄清楚电流如何能在一块固态晶体里流动而产生放大作用——有必要从晶体的原子结构讲起。(不定式短语 to understand ...是目的状语。how it is that ...是强调句型，强调 how。in such a way as to ...是结果状语。to start ...是主语，it 是形式主语。)

371. Experts now predict that the IC (integrated circuit) has brought in an era of change so fundamental and wide-sweeping that it already has the characteristics of a second industrial revolution.

现在专家们预言，集成电路已经带来一个变革的时代，这种变革如此重大、范围又是这样广泛，以致它已具有第二次工业革命的特征了。(so fundamental ... that ...到句末，修饰 change, it 代替 change.)

372. Although one cannot determine the amount of flux (total number of lines) which exists in the body of the magnet, it is considered that the lines of force thread through the body of the magnet from the south to the north pole.

虽然人们不能确定磁体内部的磁通量（磁力线的总数），但可以认为磁力线是从 S 极到 N 极通过磁体的。(although 引导让步状语从句，that 引出主语从句，it 是形式主语。)

373. It is obviously useless to devote great efforts and expense to education, technical training and planning if, for psychological reasons, the population as a whole fails to turn theory into effective action.

如果由于心理上的原因，人口问题整个说来未能把理论付诸实施，那么即使在教育、技术培训以及规划方面投入大量的人力和财力，显而易见，其结果也是徒劳无益的。（It 代替 to devote ... planning.）

374. It would be impossible to separate our world from our sun, and it took a long time for men to learn how to separate the electrons from their sun, which is called a nucleus.

把我们的地球与太阳分开是不可能的，而人们花费了很长的时间才学会如何把电子与它们的太阳（称为原子核）分开。（It 是形式主语，代替不定式短语 to separate ... sun。第二个 it 是形式主语代替 to learn ... nucleus.）

375. For the last fifty years, the globe has been warming up. It is true that the average temperature rise is only about two degrees, but that has been enough to start the glaciers receding in many parts of the world.

在过去 50 年间，地球一直在变暖。诚然，平均气温仅升高两度左右，但这足以引起世界上许多地区的冰川消融。（It 是形式主语，代替 that 引导的主语从句，that 代替上句整个内容。）

376. The moon pulls the water up under it, making a high tide and a low tide, and since the earth spins underneath, that makes the tide at one station go up and down every 24 hours.

海水受到月球向上吸引的作用，结果形成涨潮与落潮现象，同时由于地球在月球下面旋转，这就造成了某一地区每隔 24 小时发生一次涨潮与落潮。（it 代替 moon，末句中 that 指上句整个内容。）

377. It must be clear from what we have already learnt that man is much more than a machine; but in some respects he resembles a machine, and it is instructive to compare the two.

从我们已经学到的必须清楚地认识到：人要比机器高明得多，但在某些方面人类似于机器，因此，比较这两者是有启发的。（that 引导的是主语从句，it 是形式主语。what 引导的是宾语从句，它在从句中是 have learnt 的宾语。）

378. We shall require a special theoretical structure when we deal with atomic quantities. The technique is called quantum mechanics; it will be considered in the last chapter of the book.

我们研究微观量时，将需要一种特殊的理论结构，这种理论结构称为量子力学。本书最后一章将讨论这一理论。(technique 前有定冠词 the，这里用来替代 theoretical structure。)

379. The difficulties that the lunar explorers have to encounter are incomparably greater than those that have to be faced in the endeavour to reach the summit of Mount Jolmo Lungma.

登月探险者所遇到的困难，比努力攀登珠穆朗玛峰所遇到的困难大得无法比拟。(those 代替 difficulties。)

380. We can make use of the fact that solids expand when they are heated, and contract when they get colder; and that they do it at different speed.

我们可以利用固体热胀冷缩以及各种固体热胀冷缩的速度不同这一事实。(句中 they 代替 solids, it 代替上句整个内容。)

381. It was reported that a certain man in Holland had constructed a spyglass by means of which visible objects were distinctly seen as if near by, though they were very distant from observer.

根据报导，荷兰有一个人研制出了一种小型望远镜，借助它可以清楚地看出远离观察者的物体，就好像在近处一样。(had constructed 所表示的行为发生的时间先于 was reported，即“制造”在先，“报导”在后，所以 construct 要用过去完成时态。It 是形式主语代替 that 引导的主语从句。)

382. How do you decide what to do with a piece of land? It depends upon the land, and it depends upon the needs of the people and their values.

你怎样决定如何利用一块土地呢？这取决于这块土地，也取决于人们的需要以及他们对这块土地的评价标准。(句中两个 it 均代替上句的整个内容。)

383. It seems that even an increase in the amount of carbon dioxide in the atmosphere to eight times its present value will produce an increase in temperature of only 2°C , which would take place over several thousand years.

看来，即使大气中二氧化碳含量增大到现有含量的 8 倍，气温似乎也不过升高 2°C 而已，而这一过程可能需要几千年的时间。(It 是形式主语，代替 that 引导的主语从句。)

384. The atmosphere serves other purposes besides: it helps to maintain a fairly even temperature, so that over most of the world it is neither so hot that life is scorched, nor so cold that everything freezes.

大气层还有其他用途：帮助维持一个相当均衡的温度，因而在地球上大部分区域，气候既不会热得使生物枯萎，也不会冷得使万物冻僵。（第一个 it 代替 The atmosphere。第二个 it 是无人称代词，指气候。）

385. Indeed, almost every scientist now finds it impossible to read all the work relevant to his own subject, far less to read extensively outside it.

的确，几乎每个科学家现在都不可能全部阅读与他从事的研究课题有关的所有著作，更谈不上去阅读研究课题以外的著作了。（不定式短语 to read ... 是 finds 的宾语，impossible 是宾语补足语，it 是形式宾语。relevant to ... subject 是形容词短语，修饰 work。far less 表示否定语气，less 是 little 的比较级，为了加重比较的程度。it 为形式宾语，代替真正宾语 to read ... outside it。）

386. The oxygen supplied in the space suit is temperature-controlled so that no matter how cold it gets outside the spaceship – or inside – your body remains comfortable.

给宇宙服供应氧气的温度是可控制的，因而，无论宇宙飞船的内外温度变得怎样冷，人仍感到很舒适。（it 是无人称代词，表示天气。）

387. Once Newton said, “If I have seen further than most men, it is by standing on the shoulders of giants.” The “giants” he was thinking of were the great scientists who had lived before his times.

有一次牛顿说：“如果说我比多数人看得远一些，那是由于我站在巨人肩上的缘故。”牛顿所指的“巨人”，就是指生活在他以前的伟大科学家们。（it 代替 If 引导整个条件从句的内容。）

388. Since a large wire has less resistance than a smaller wire, it follows that a larger wire will carry more current than a smaller one.

由于粗导线比细导线的电阻小，由此可见，较粗的导线比细导线能通过更大的电流。（it

follows that . . . , “由此可见”。one 代替 wire。)

389. We know, too, that once the heavier body is moving at a given speed, it is harder to stop than the lighter one moving at the same speed.

我们也知道,一旦较重的物体以一定的速度运动起来,要想使它停止运动,就比制动以同样速度运动的较轻物体难得多。(one 代替 body。)

390. Unlike magnetism, gravitation is not found only in iron and steel, it is in every object large or small; but large objects, such as the earth, have a stronger pull than small ones .

万有引力与磁力不同,并不是只有钢铁才有引力,每个物体不论大小都有引力,只不过大物体(如地球)的引力比小物体更大罢了。(it 代替 gravitation, ones 代替 objects。)

391. This may lead not only to a failure to discover positive items, but may also result in important negative aspects of the investigation remaining undiscovered.

这不仅使我们不能发现研究工作中的积极(方面的)因素,而且也不能使人们发现研究工作中消极(方面的)因素。(句中 items 不能理解成“项目”。它是个替代词,替代 aspects。这里主要是通过词汇手段,即 positive 和 negative 来看 items 和 aspects 两词之间的关系,即用 items 来替代 aspects。)

392. To understand the ecology of a community, the ecologic life histories of at least the most important plants in it must first be understood, so that autecology is of necessity the foundation upon which synecology is built.

为了了解某一植物群落的生态学,至少必须首先了解该群落中最主要的植物的生态生活史,因此,个体生态学必然是赖以建立群落生态学的基础。(it 代替 community。)

393. Because energy is manifested in so many and such elusive forms – heat, light, electricity, sound, radioactivity, chemical reactivity, mechanical motion – it took about 50 years longer to develop the concept of conservation of energy.

因为能量的表现形式——热、光、电、声、放射能、化学反应、机械运动——是如此之多,又是这样难以捉摸,所以建立能量守恒这一概念大约花了 50 年之久的时间。(破折号内的词是 forms 的同位语。it 是形式主语,代替不定式短语 to develop the concept . . .。)

394. It would be beyond the scope of this book to consider in detail the theory of the propagation and interception of electromagnetic waves.

详细地讨论电磁波的传播理论与侦听问题就超出了本书的范围。(beyond the scope of ..., “超出……范围”。It 是形式主语代替不定式短语 to consider ...waves。)

395. Once it is given a “program” – that is, a carefully worked-out set of instructions devised by a technician – a computer can gather a large amount of information for many purposes.

一旦给计算机输入了程序——即由技术人员精心编制的一套指令，它就能为各种不同目的收集大量信息。(it 用来代替 computer，通常实词用于主句，代词用于从句。)

396. Since the surface gravitation on the moon is only about one sixth of that on the earth, a man weighing 120 pounds on the earth would weigh 20 pounds on the moon.

因为月球表面的引力大约只有地球上引力的 1/6，因此在地球上体重 120 磅的人在月球上只有 20 磅重。(one sixth, “1/6”，基数词 + 序数词构成分数。that 用来代替 gravitation。)

397. It was Einstein who first showed in theory how the energy of the atom might be released, which led to the practical use of nuclear power today.

正是爱因斯坦首次用理论表明了怎样释放原子能，这导致了当今对核能的实际应用。(It was ...who ...为强调句型，强调 Einstein。)

398. Just as water flows out of a large pipe with less resistance than out of a small pipe, electricity passes more easily through a coarse or a short wire than through a fine or a long one.

正如水从粗的管道流出比从细的管道流出阻力要小一样，电流通过粗的或短的导线比通过细的或长的导线要容易得多。(just as, “正如……那样”，引出比较状语从句。one 代替 wire。)

399. At this stage it may be worth while considering a few of the ways in which science may develop in the near future, i.e. the next decade or so.

不久的将来，即未来的 10 年左右，科学发展的若干情况值得在这里研究一下。(it 是形式主语，代替动名词短语 considering ...or so。be worth while, “是值得的”。or so “大约”，“左右”。)

400. It was customary in Newton's times for the great mathematicians of Europe to spend months on solving a problem and then offer it as a challenge to all others.

在牛顿那个时代，欧洲一些伟大的数学家常花上几个月时间来解一道难题，然后以此向其他人提出挑战，这已成为数学家们的习惯。（to spend...and then offer...这两个不定式是真正主语，for...Europe是这两个不定式的逻辑主体。It是形式主语，代替这两个不定式短语，第二个it代替problem。）

401. It would be a mistake to think that a quick elementary study of physics can explain the path of a jet plane in the sky, or the intricate rhythms of a diesel engine.

认为很快地学点物理学的初步知识，就能说明喷气式飞机在天空的飞行轨迹或内燃机复杂的往复运动，那就错了。（It是形式主语，代替不定式短语to think that...engine。）

402. Although rockets fly at phenomenal speed it still takes a silo-launched missile more than 40 minutes to fly between Russia and the United States.

虽然火箭飞行的速度惊人，但由发射并发出的导弹要飞越俄美两国之间的距离仍需40多分钟。（it是形式主语，代替不定式短语to fly...United States。）

403. How long do you think it would take you to count that many atoms, if you could count one a second, day and night? It would take one hundred thousand billion years!

你想想，如果你1秒钟能数一个原子，日以继夜地数这么多的原子要花多少时间呢？这要花100万亿年！（it为形式主语，代替不定式短语to count...atoms。第二个it代替上句的整个内容。that不是代词，而是副词，意为“那么”。）

404. Weight and mass are two different properties of matter, the former being determined by the gravitational attraction between the earth and the body, the latter by the inertia of the body.

重量和质量是物体的两种不同的属性，重量决定于地球与物体之间的引力，而质量决定于物体的惯性。（the former代替weight，the latter代替mass，均引出分词独立结构。the latter后省略了being determined。）

405. Although we believe today that it is actually the negative charges that move in a metallic

conductor, it is often convenient to describe a process as if it were the positive charges that moved.

现在虽然我们确信，实际上是负电荷在金属导体中运动，但为了方便起见，通常把这一过程说成仿佛是正电荷在运动。（第一句中的 *it is ... that ...* 和末句 *it were ... that ...* 均是强调句型。第二句中不定式短语 *to describe ...* 是真正主语，*it* 是形式主语。*as if it ...* 这里 *it* 代替 *process*。）

406. If the south pole is brought near the north pole of the suspended magnet, the latter will move toward the nearby south pole.

如果将磁铁的 S 极靠近悬挂着的磁铁的 N 极，则此 N 极将朝着靠近的 S 极移动。（*the latter* 代替 *the north pole*。）

407. Scientists are always most gratified to find that an underlying explanation of many phenomena suggests in its turn the possibility of proving its own accuracy or falsity by a suitably arranged critical experiments.

科学家们总是乐意去探索，对各种自然现象做出根本性的解释，其本身就意味着有可能通过适当安排一系列吹毛求疵的实验来验证这种解释的准确性和错误程度。（句中两个 *its* 均指 *explanation*。*in one's turn*，“依次”，“本身也”。）

408. The wires must never touch the steel pylons, if they did that, the current would escape to the earth through the steel.

电线绝不能触到铁塔，如果发生这种情况，电流会通过钢铁流失到地下。（第二句是虚拟语气。*they* 代替 *wires*。*that* 指上句所说“电线触到铁塔”这件事。）

409. Charles Booth tried to discover how it was that an industrial system which created great wealth nevertheless forced nearly one-third of the population of the richest city in the world to live in 'a state of chronic want'.

查理斯·布什曾试图揭示，一种工业体制尽管创造了巨大财富，却怎么会迫使世界上最富裕的城市中的近 1/3 居民生活在“长期贫困状态”中。（*it was that* 用来强调 *how*。）

410. When an engineer is designing a building, a bridge, an airplane, or anything else, he must know the properties of all the metals in order to choose the ones that best suit his needs.

当工程师在设计建筑物、桥梁、飞机或其他任何结构物时，他必须了解所有金属的性能，以便选择最适合他需要的金属。(the ones 代替 metals。)

411. Whether people realize it or not, computers control so many parts of society that, without them, people's lives would be made more difficult.

不论人们是否意识到这一点，计算机控制着社会许多部门，以致离开计算机人们的生活就会变得很困难。(it 代替整个主句的内容。)

412. Compared with the largest distances on the earth, the distance of the sun from the earth is so great that we find it almost impossible to comprehend.

与地球上最大的距离相比，从地球到太阳的距离也大得几乎难以想像。(结果状语从句中 it 是形式宾语，代替动词不定式宾语 to comprehend。)

413. It is through the intermediary of the electric circuit that energy is transmitted electrically from the primary source, no matter where it is situated to the ultimate consumer wherever he desires it.

不论电能位于何处，正是通过电路这个媒介物才能把电能由电源输送到最远的用户，不论这用户在什么地方需要电能。(It is ... that 为强调句型，第二个 it 代替 the primary source，第三个 it 代替 energy。)

414. About 2 000 years ago, Wang Chong, a Chinese philosopher, discovered that if one rubbed a piece of amber with a piece of fur of wood, he could always produce electricity.

大约 2000 年前，中国哲学家王充发现：如果有人把一块琥珀与一块兽皮或木头相互摩擦，总会产生电。(one 泛指人。)

415. All that we should rely upon would just be experimental results rather than theoretical estimations, although the latter have very important bearings upon the choice of the methods and the treatments of the data of the experiments.

虽然理论上的判断对选择实验方法以及处理实验数据都有很重要的意义，但是我们应当信赖的一切只能是实验结果而不是理论上的判断。(that we should rely upon 是定语从句，修饰 all. the latter 代替 theoretical estimations。)

416. Yet, in the West, science and technology have made it possible for us to have a plentiful supply of food, produced by only a fraction of the labour that was necessary even a few decades ago.

此外，在西方，科学和技术已经使我们有可能获得充裕的食物，而生产这些食物所花费的劳动只不过是几十年前必须花费的一小部分。（it 是形式宾语代替 to have ... ago.）

417. The basically correct statement that the heat released by the complete fission of one pound of nuclear fuel is equivalent to that obtainable from 1 400 tons of coal, has led to some erroneous conclusions.

1 磅核燃料完全裂变时所释放出来的热量相当于从 1 400 吨煤里所能得到的热量，这一基本正确的论述导致了若干错误的结论。（statement 是主句的主语，谓语是 has led。第一个 that 引出的是同位语从句。第二个 that 是代词，代替 heat。分词短语 released by ... fuel 作定语，修饰 heat。obtainable from ... coal 是形容词短语，修饰 that 即 heat。）

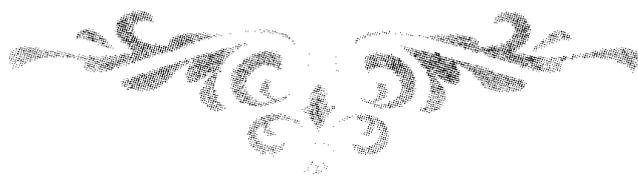
418. It is perhaps unfortunate that when it was first decided in which direction an electric current flowed the early scientists happened to choose the direction opposite to the flow of electrons.

在首次要规定电流沿什么方向流动时，早期的科学家偶然地选择了与电子流动相反的方向作为电流的方向，这也许是令人遗憾的。（it was ... decided in which direction ... flowed 中，it 是形式主语，which 引导的是主语从句。in which direction 在从句中是 flowed 的地点状语。happen + 动词不定式表示偶然做某事。）

419. Now we do not have the option of using a measuring device that produces an interaction smaller than the quantity to be measured, because we do not have a device that small. The disturbance introduced is of the same order of magnitude as the quantity to be measured, and it may not be possible even to estimate or account for it.

现在我们不可能选择一种测量仪器，它所产生的误差小于待测量的量，因为我们没有那么小的仪器。这样产生的误差与待测量的量是同一数量级，因此，要测出这个量是不可能的。（第二句中 the disturbance 就是第一句中 an interaction 的替代词。interaction 第一次出现时，用了不定冠词 an，第二次出现时本来可用 the interaction，为了避免重复，就用 the disturbance 代替。）

第四难点 省 略



英语中，句子结构最忌讳重复。为了避免重复，有两大手段：一是用各种代词或替换词来代替名词及用 do 来代替动词。二是省略。省略就是为了避免重复，使句子的结构精练。

省略有下列几种情况：

- (1) 连词 + 形容词（名词，介词短语）结构中的省略；
- (2) than 引导的状语从句中的省略；
- (3) the more . . . , the more . . . 句型中的省略；
- (4) so 引导的句子中的省略；
- (5) if + 形容词（如 possible）结构中的省略；
- (6) whatever 等引导的让步状语从句中的省略；
- (7) that 引导的定语从句中关联词 that 的省略；
- (8) 某些名词如 way（distance, direction）后连词的省略；
- (9) hence 后的省略；
- (10) 并列复合句中相同成分的省略；
- (11) 虚拟条件从句中 if 的省略。

句中省略实例的分析与翻译

420. When we examine environmental problems in a global context, the first thing that impresses us is the variety of perspectives and concerns they evoke.

当我们考察全球范围的环境问题时，给我们印象较深的第一件事就是这些问题所造成的各种前景和忧虑。（in a global context 介词短语作定语修饰 problems。they evoke 为省略 that 的定语从句，that 做 evoke 的宾语，可省略。）

421. Industry requires workers who are ready and able to move off the land and to move again whenever necessary.

工业要求工人们随时作好准备，必要时能离开他们的土地再次迁移。（whenever 后省去了 it is, it 代替整个句子内容。）

422. Practical applications of mechanics have not been excluded – on the contrary, these have been introduced wherever possible as illustrations of principles.

并不是不考虑力学的实际应用，正相反，凡是有可能的地方，都已介绍了这些应用，作为对力学原理的说明。（on the contrary, “恰恰相反”。wherever possible 中间省略了 it is, it 指前

句中的谓语行为。)

423. As much as 40 per cent of our tropical forests may be gone by the year 2000, and with them, hundreds of thousands of irreplaceable plant and animal species.

到 2000 年时，高达 40% 的热带森林会消失，无数无法补偿的动植物物种也可能随之而灭绝。(with them 后省略了 may be gone。)

424. As with oxygen and water vapor, we shall continually meet carbon dioxide as we continue our explorations in the world around us.

当我们继续探索我们周围的世界时，正像我们会遇到氧和水蒸气一样，也会不断地遇到二氧化碳。(As 后省略了 we meet。)

425. The whole industrial process which makes many of the goods and machines we need and use in our daily lives, is bound to create a number of waste products which upset the environmental balance, or the ecological balance as it is also known.

生产我们日常生活中必须使用的物品和机器的整个工业过程势必要产生大量的废料。这些废料破坏了环境平衡，也就是破坏了我们所了解的生态平衡。(we need and use ... lives 是省略 that 的定语从句，修饰 goods 和 machines, that 在句中是 need 和 use 的宾语，that 可以省略。be bound to do, “势必要……”。or 引导同义短语，意为“即”，指同一件事。or 可连接两个不同的事物，如：Which is it, X or Y?)

426. In other words, electronics is the way we harness electrons and put them to work and to do many things we have never been able to do before.

换言之，电子学是我们利用电子使其做功并为我们做出许多以前不能做的事情的一种方法。(way 后面省略了 in which。)

427. The time it takes for the echo of the sound wave to return to the instrument on the ship gives the operator the depth of the water.

声波的回声返回到船上的仪器所需的时间，可使操作人员确定水的深度。(time 后省略了 that, 做 takes 的宾语。)

428. Let us first look at how a rocket works and then have a study of the way rockets are made to travel out into space.

首先让我们看看火箭是怎样工作的，然后再研究一下把火箭送入空间的方法。(rockets are made...space 是省略 in which 的定语从句，修饰 way。不定式短语 to travel...是主语 rockets 的补足语。)

429. Inorganic chemistry is linked closely to geology, mineralogy, and metallurgy; organic chemistry to physiology, biochemistry, and biology in general.

无机化学同地质学、矿物学、冶金学有着密切关系，而有机化学总的说来则与生理学、生物化学、生物学有密切关系。(organic chemistry 后省略了 is linked。)

430. Color is dependent upon wave length, violet light having the shortest wave length and red the longest.

颜色视波长而定，紫光波长最短，红光最长。(violet light having...是分词独立结构，对主句谓语起补充说明作用。red 后省略了 light having, longest 后省略了 wave length。)

431. Wherever rock are to be seen in cliffs and quarries, their arrangement and sequence can be observed and their story deciphered.

无论是在峭壁上还是在采石场见到岩石，对它们的排列和顺序可以进行观察，它们的历史可以得到解释。(wherever 引导让步状语从句。be+不定式结构有“将来”意义。their story 后省略 can be, 为了避免重复。)

432. The amount of work done by a force acting on an object is equal to the amount of the force multiplied by the distance the object is moved.

作用在一个物体上的力所做的功的大小，等于该力的大小乘以该物体所移动的距离。(the distance 后省略了 through which。)

433. The emf is found to be the same, for the same rate of change of flux, whatever the size, shape, or position of the loop, so long as the loop encircles the solenoid.

人们发现，不论闭合回路的大小、形状或位置如何，只要该回路环绕着电磁线圈，那么磁

通变化率相同时，感应的电动势就是相同的。（在 loop 后省略了 may be。）

434. First we must consider what goes to make a living thing, whether plant or animal, and then what conditions living things need in order to go on living.

首先，我们必须考虑生物体——不论是动物还是植物——是由什么组成的。其次，还要考虑生物体为了生存需要什么样的条件。（whether 后省了 it is, it 代替 living thing。）

435. Had radio not been invented, many jobs, such as helping aeroplanes to land in bad weather and calling doctors to far-off places, would not have been possible.

如果不曾发明无线电，很多工作就做不成了，譬如：在恶劣的天气里帮助飞机着陆，请医生到遥远的地方去等等。（Had radio ... 是省略 if 的倒装虚拟条件句，等于 If radio had not been invented.）

436. The further you go out into the scientific and technological frontiers, especially in the kinds of things we are seeing today, you are going to find mathematics.

你越是深入到科技尖端领域，特别是今天我们所看到的各种先进的领域，你就越需要求助于数学。（we are seeing today 是省略关系代词的定语从句。）

437. Electric wires are made of copper or some other metal. The reason they are is that electric currents flow readily through metals.

电线由铜或某种其他金属制成。电线之所以用这些金属制成，是因为电流容易通过这些金属。（they are 是省略了 why 的定语从句，are 后省略了 made of copper or some other metal.）

438. If we observe the actions of men, whether as individuals or as groups, and whether scientists or non-scientists, we find that they frequently fall into avoidable error because of a failure to reason correctly.

当我们观察人的行为时，不论是个人或是集体，不论是科学家或不是科学家，我们发现，他们经常由于不正确的推理而陷入不可避免的错误之中。（句中两个 whether 后均省略了 they are, they 代表 men.）

439. In other words, most substances are more soluble in hot water or other solvents than they

are in the cold solvents.

换言之，大多数物质在热水中或其他热溶剂中要比在冷溶剂中更易于溶解。（从句中 are 后省略了 soluble。）

440. A machine may be designed to lift a much larger weight than the force that is applied, but it can never produce more work than was supplied to it.

可以设计出一种机器来举起一个比所用的力大得多的重物，但这个机器所产生的功绝不可能比给予它的功更多。（than 后省略了主语 work。）

441. When we apply pressure on the surface of any enclosed gas, the gas compresses, but at the same time it exerts an equal pressure on any surface it touches, just as liquids do.

当我们对任何封闭气体的表面加压时，气体会压缩，但同时，气体会像液体那样，以相等的压力作用在它所接触的任一表面上。（it touches 是省略关系代词的定语从句，修饰 surface。do 代替 exerts 及其宾语部分。）

442. The composition of the sun and the nature of distant galaxies on the one hand, or the structure of matter and the properties of atoms on the other, are known to us because of the light these objects emit.

由于物体都有光辐射，因此，一方面我们知道太阳的组成部分和遥远星系的性质，另一方面我们也可了解物质的结构和原子的特性。（these objects emit 是省略了关系代词的定语从句，that 是 emit 的宾语，可省略。）

443. Tables of quantitative data, however extensive and accurate, do not constitute scientific knowledge, though they may be raw material for the scientist.

数据表格不论是如何全面和精确，也不能构成科学知识，尽管这些数据可能是科学家的原始资料。（however 引出让步状语从句，句末省略了 they may be。）

444. The fact that aluminium has over 50% of the specific conductivity of copper means that, weight for weight, it is a better conductor of electricity than is copper.

铝的电导率是铜电导率的 50% 多，这意味着，若两种材料重量相等，那么铝作为导电体要比铜好。（than 从句中主语是 copper, is 后省略了 good。）

445. If successful, such a device will make it possible for a diver to stay under water without having to worry about how long his supply of oxygen will last, thus increasing the potential for exploration.

如果这种装置成功的话，它将使潜水员有可能停留在水下而不必担心他的氧气还能维持多久，从而提高他的探索潜力。(if 后省略了 it is, it 代替 a device。)

446. But we do know something about the technology already in place and the direction it is likely to take in the decade ahead.

但是，对于目前的技术现状及其今后十年可能发展的方向，我们确实略知一二。(direction 后省去 in which。)

447. Computers provide the means for greater speed and accuracy in working with ideas than had previously been possible.

计算机提供了思维活动的手段，其运行的速度和计算的精度是前所未有的。(than 后省略了 speed and accuracy。)

448. To measure the speed of a moving body we measure the distance it travels and the time required.

为了测量运动物体的速度，我们要测量物体移动的距离和所需的时间。(distance 后省略了 through which。)

449. Though some power is lost as heat within the transformers, it is far less than when large currents are forced through long lines.

尽管一些功率在变压器里作为热损耗掉了，但是这种损耗比当电流通过长导线时的损耗要小得多。(than 后的比较状语从句 it is 完全省略。)

450. The largest current will be obtained when the resistance of the rheostat is minimum and the smallest current when the resistance is maximum.

当变阻器的电阻最小时，得到的电流最大，当电阻最大时，得到的电流最小。(smallest current 后面省略了谓语 will be obtained。)

451. Everything a human knows he was socially taught; everything he obtains was got through social mediation – it took the socialised contributory labour of countless thousands merely to supply the simply daily needs of any reader of these words – even to enable him to read.

人知道的一切，社会授与他的一切，人所获得的一切都是通过社会媒介才得到的。例如，这篇文章的读者日常生活中所需要的最简单的生活必需品也都是由成千上万劳动者通过社会分工而提供的；甚至使他能够读出这篇文章也是如此。(a human knows he was socially taught 分号后的 he obtains 都是省略了 that 的定语从句，分别修饰两个 everything，it 为形式主语代替不定式短语 to supply ... 和 even to enable ...。两个破折号之间的句子用来具体说明上句的实例。)

452. River water, ground water, and even rainwater always contain other dissolved or suspended elements, and these, even when present in small quantities, play an important role.

河水、地下水甚至雨水总是含有其他溶解的或悬浮的物质。(these 代替上面三种水，在句中作主语，谓语是 play。even when ... 是省略 they are 的时间状语从句。在状语从句中如果主语与其主句中的主语相同，而部分谓语系动词是 be，这时 they are (were) 或 it is (was) 可省略。)

453. It is of interest to note that the U.S. consumes more than one-half of the world's supply of energy, the continent of Asia only 1/20.

值得注意的是，美国的能源消费量占世界的一半以上，而亚洲大陆消费的能源只有世界消费量的 1/20。(Asia 后面省略了谓语 consumes，在 1/20 后省略了 of the world's supply of energy。)

454. The transference of energy from a body capable of doing work to another upon which the work is to be done is often accomplished more advantageously by the use of machines than in any other way.

利用机械把能量从一个能做功的物体传递到另一个要对其做功的物体，往往比用其他方法来实现这一能量传递过程更为有利。(than 后省略了 it is accomplished，it 代替 transference。)

455. By many experiments Galileo showed that, apart from differences caused by air resis-

tance, all bodies fall to the ground at the same speed, whatever their weight.

经过多次实验，伽利略证明，一切物体，不论其重量如何，除了因空气阻力引起的差别外，都以同样的速度落到地面。（whatever 引出让步状语从句，从句中省略了 may be, whatever 在从句中作 may be 的表语。）

456. As a result of this universal gravitation everything on or near the surface of the earth is attracted toward the earth with a force we call weight.

由于万有引力的作用，地球表面上或靠近地球表面的一切物体，都要受到我们称之为重量的地球引力的作用。（we call weight 是省略关联词的定语从句，修饰 a force。）

457. Should light take no space of time to travel from the sun to the earth, we might see it as it was originally.

如果光线从太阳照射到地球不占用时间，那么我们看到的太阳就是它本来的样子。（Should light ... 是省略 if 的倒装虚拟条件句，等于 If light should take no space ... 。）

458. Being very short of money and wanting to do something useful, I applied, fearing as I did so, that without a degree and with no experience in teaching my chances of getting the job were slim.

由于我缺钱花，同时也想做点有益的工作，于是我就提出申请（这项工作），当我申请时，我又害怕。既没有学位又没有教学经验，要获得这项工作的机遇是很渺茫的。（Being...and wanting... 是两个现在分词短语，有原因状语的意味。fearing...that... 是现在分词短语，（它又带上宾语从句）作状语，有伴随行为意味，用来对 did so 进行补充说明。as 用作连词作“当...时”解。did 用来替代动词 applied，其后省略 for the job。）

459. A successful scientist is a good observer, accurate, patient and objective and applies persistent and logical thought to the observations he makes.

一位成功的科学家就是一位卓越的观察家，既精确，又耐心，又客观；他善于把一贯合乎逻辑的思想用来阐明他所观察到的事实和现象。（he makes 是省略 that 的定语从句。）

460. Optical apparatus designed to utilize interference effects permits the measurement of wavelengths or distances with a greater precision than that attainable in almost any other type of

physical measurement.

利用干涉效应设计的光学仪器测量波长或距离时，可以达到比几乎所有其他类型的物理测量更高的精确度。(than 后的 that 代替 precision, 省略了 is。)

461. To rid the world of pollution – pollution caused not just by cars, but by all of modern industrial life – many people believe we must make some fundamental changes in the way many of us live.

为了使世界消除污染——不只是由汽车造成的污染，而且还有现代工业造成的一切污染——许多人认为，我们多数人的生活方式必须做一些根本改变。(many of us live 是省略了 in which 的定语从句。)

462. All substances on the earth as well as out of it, whether gaseous, liquid or solid, are made up of atoms.

地球上以及地球之外的一切物质，不论是气体、液体或固体，都是由原子组成的。(whether 后省略了 they are。)

463. We can visualize some supergenius of the future who will take protons, neutrons, and electrons and combine them in any way he chooses to make iron, or oxygen, or gold, or any other element.

我们可以想像，未来的某个超级天才会把质子、中子和电子按他选择的方法组合在一起制造铁、氧、金子或任何其他元素。(who 引导的是定语从句，修饰 supergenius。he chooses 是省略了关联词的定语从句，省略了 in which。)

464. Any problem can, in general, be understood better if we solve it in an inertial system, and accelerated coordinate systems should be avoided if possible.

任何问题，如果在惯性坐标系中求解，通常能理解得更好，因此，应尽可能避免使用加速坐标系。(if possible 中省略 it is, it 代替上句。)

465. To get a description of direction along the line we shall call the line on one side of the origin positive, on the other side negative.

为了描述这条直线的方向，我们把位于原点一侧的直线叫做正的，而把位于原点另一侧的

直线叫做负的。(第二句中 on the other side 前面省略了 we shall call the line, 其后省略了 of the origin。)

466. From the way atoms act, men have been able to compare their weight and list them in a table beginning with the lightest and ending with the heaviest.

根据原子的作用方式,人们已经能够比较出它们的重量并把各种原子按从最轻到最重的顺序列成周期表。(way 后省略 in which。)

467. By making vehicles lighter in weight than when they were made principally of iron and steel, aluminum has greatly reduced the amount of fuel needed to move them.

由于铝制的运载工具的重量比以前主要用钢铁制造的运载工具要轻,从而大大地减少了开动这些运载工具所需的燃料。(than 后省略了 they are light。)

468. An ultrasonic wave is beamed into the part to be tested. The way the beam is echoed back into a receiving device tells whether there is a defect in the material and where the defect is.

将超声波射入受探测部位,通过波束返回到接收装置的方式,即可探明材料中是否有缺陷及其缺陷的位置。(The way 后省略了 in which。)

469. The reason man cannot live on sea water is that the human kidney cannot excrete salts in a concentration of more than about 2 percent.

人之所以不能靠海水生存是因为人的肾脏不能排出浓度超过 2% 左右的盐分。(The reason 后省略了 why, why 引出的定语从句修饰 reason。)

470. All bodies, whatever their mass, fall with the same acceleration at the same point on the earth's surface.

所有的物体,不论其质量如何,在地球表面的同一点下落时,都具有同样的加速度。(让步状语从句 whatever ... 后省略了 may be。)

471. When a current of electricity flows from one body to another the body from which it flows is said to be at a higher potential than the body to which it flows.

当电流由一个物体流向另一物体时,我们就说输出电流的那个物体比输入电流的那个物体

处于更高的电位。(than 引导的从句中的 flows 后省略了 is said to be at a potential。)

472. If you look carefully at the outside of the atom, you will see tiny bits of matter whirling around the nucleus much the way planets spin around the sun.

如果你仔细地观察一下原子的外部,你就会看到有很小的粒子围绕着原子核旋转,几乎就像行星围绕着太阳旋转那样。(planets spin ...是省略了 in which 的定语从句。)

473. What happens when we mix elements? Sometimes nothing at all, but sometimes something very dramatic.

当我们把几种元素混合在一起时,会发生什么现象呢?有时什么也不发生,但有时会发生非常惊人的现象。(后两个句子中都省略了谓语 happens。very dramatic 是后置定语,用来修饰 something。形容词修饰不定代词 anything, something, everybody 等时,只能作后置定语。)

474. An emf is positive if the direction of its associated field E_n is in the chosen positive direction, negative if in the opposite direction.

如果把与某一电动势要联系的电场 E_n 选为正方向,则此电动势为正,如果 E_n 选为反方向,则此电动势为负。(第二个并列分句为省略句。)

475. It is easier for us to apply a force of 50 pounds through a distance of 40 feet than to apply a force of 2 000 pounds through a distance of one foot.

对我们来说,加 50 磅的力通过 40 英尺的距离比加 2 000 磅的力通过 1 英尺距离要容易得多。(than 后省略了 it is。)

476. It is easy to compress a gas, it is just a matter of reducing the space between the molecules. Like a liquid a gas has no shape, but unlike a liquid it will expand and fill any container it is put in.

气体是很容易压缩的,这正是压缩分子之间距离的根据。气体和液体一样没有形状,但又不同于液体,气体膨胀时会充满任何盛放它的容器。(it is just a matter ... 中, it 指上句的整个内容, matter, “原因”, “根据”。后面两个 it 均代替 gas。)

477. Conversely, if there is no current in a conductor, and hence no motion of its free

charges, the electric field in the conductor is zero.

相反, 如果导体中没有电流, 因而也没有自由电荷的运动, 则导体中的电场为零。(hence 后省略了 there is。)

478. To condense steam back to liquid water requires great quantities of cooling water which, once its job is done, is returned to the environment 10° to 20° warmer than when it was pumped from the river, lake, or estuary.

把蒸汽冷凝成液态水需要大量的冷却水, 冷却水一旦完成了它的任务, 就被排放掉, 其温度要比从江河、湖泊或海湾里汲出时高出 $10^{\circ}\sim 20^{\circ}$ 。(than 后省略了 it is warm。)

479. Should a screen be placed at the point where we should expect to find the image, this image would in fact appear on the screen.

如果把屏幕放在我们预期可以成像的地方, 像实际上就会出现在屏幕上。(Should a screen 是省略 if 的倒装虚拟条件句, 等于 If a screen should be placed ...。)

480. In Coulomb's time, no unit of charge had been defined, nor any method of comparing a given charge with a unit.

在库仑生活的那个年代, 既没有确定电荷的单位, 也没有把给定电荷与某一单位相比较的任何方法。(nor 后省略了与上句相同的谓语。)

481. It is hardly to be expected that a book of this type should contain much, if any, original material, the author's aim being to give a brief outline of the fundamental concept of mechanics.

很难指望这一类的书会包含有大量的原始资料, 这类资料即便有也很少, 因为作者的意图是给力学的基本概念勾画出一个简要的轮廓。(if any 是省略句, 省略了 there is。因为前面主句里有 hardly 这一否定词, 所以 if any 有让步意味, 意为“即便有, 也很少”。the author's aim being ... 是分词独立结构, 有原因的意味。)

482. We know that there are 180 degrees on the Fahrenheit scale between freezing-point and boiling-point and 100 degrees on the centigrade scale over the same range.

我们知道, 华氏温度计在冰点与沸点之间分为 180 度, 而摄氏温度计在同样的温度范围里分为 100 度。(on ... scale 和 between ... point 是两个介词短语, 都用作地点状语。在 100 de-

grees 前省去了“there are”。)

483. The time it takes for the earth to turn once on its axis, with respect to the sun, serves as the basis for the unit of time.

地球相对于太阳自转一周所需的时间可用来作为时间单位的基础。(it takes ...是省略关联词的定语从句, 其中 it 是形式主语, 代替带逻辑主体的不定式短语 for the earth to turn...。)

484. Electricity can pass through the carbon grains more easily when they are pressed together than when they are spread apart.

电流通过压缩的碳精粒要比通过松散的碳精粒更容易。(than 后的比较状语从句 it can pass through the carbon grains 完全省略。)

485. The greater the potential difference, the larger the quantity of electricity that will flow; the greater the resistance, the smaller the quantity of electricity.

电位差愈大, 则电流量愈大; 电阻愈大, 则电流量愈小。(由分号连接的这两个句子, 主句与从句均省略了系词 is。)

486. The work of Oersted thus demonstrated that magnetic effects could be produced by moving electric charges, and that of Faraday and Henry that currents could be produced by moving magnets.

于是, 奥斯特的实验证明了运动电荷能够产生磁效应, 而法拉第和亨利的实验证明了运动的磁体能够产生电流。(第二句中在 Henry 后省略了谓语 demonstrated。that of Faraday ... 中的 that 代替 work。)

487. To lift an object requires work, and the amount of work done is equal to the weight of the object multiplied by the distance it is lifted.

提升一个物体需要做功, 做功的大小等于该物体的重量乘以它被举起的高度。(distance 后省略 through which。)

488. This is the way it remained until the eighteenth century when James Watt developed the

first practical devices that enabled man to free himself from dependence upon muscles, wind, and water to make his life a bit easier.

上述情况一直保持到 18 世纪, 这时詹姆斯·瓦特发明了第一批可实际应用的设备, 它使人类从依赖体力、风力和水力的状况下摆脱出来, 从而使人类的生活变得轻松些。(在 way 后省略了 in which。)

489. The mks system of units is rapidly being accepted because it can be used in electricity as well as in all other parts of physical sciences, while the English system cannot.

米·千克·秒单位制之所以被迅速采纳, 是因为它不仅可用于物理学各个领域, 而且还用于电学方面, 而英制则不能。(在 while 连接的并列分句中, cannot 后省略了 be used in electricity as well as in all other parts of physical sciences。)

490. However rough and difficult, the experiment on heating snow shows that sometimes heat does not make things hotter.

无论这个加热雪的实验是如何粗略、如何困难, 但这一实验表明, 有时热量并不能提高物体的温度。(however 引导让步状语从句, 从句末省略了 it may be。)

491. It is hardly possible to draw a sharp line between conductors and insulators, but in general the metals may be considered conductors, while such substances as glass, porcelain and rubber are used as insulators.

在导体和绝缘体之间几乎不可能划一条明确的界线, 但通常认为金属是导体, 而像玻璃、陶瓷和橡胶这样一类物质则用作绝缘体。(在 substances 后省略了 may be considered。)

492. Even though the details of the atomic picture of matter are not fully understood, we do have definite evidence that atomic energies and velocities, whether in a solid, liquid, or, gas, increase with increasing temperature.

尽管对物质原子实际情况的细节还没有完全弄清楚, 但是我们确有一定的证据表明, 不论是固体、液体或是气体, 其原子的能量和速度是随温度的升高而增加的。(whether 后省略 they are, they 代替 energies 和 velocities。)

493. Theoretical science takes as its material the laws of nature discovered by experimental sci-

ence, and aims at reducing them, if possible to simpler forms.

理论科学把实验科学所发现的自然规律作为自己的素材,其目的在于尽可能把这些规律归纳成更为简单的形式。(条件从句 if possible 中省略了 it is。)

494. Although little has been achieved in the utilization of the abundant heat the sun is sending to the earth, practice has shown that it can do much more than merely keep us warm in the cold.

太阳辐射到地球上大量的热能,尽管这些热能几乎没有得到充分的利用,但实践已表明,太阳的热能不只是使我们在寒冷中保暖,它的用途还多得很。(than 后省去了 it can, it 指 heat of the sun。)

495. If we wish to know the lowest temperature reached during a period of time we need a minimum thermometer; if the highest, a maximum thermometer.

如果我们想知道一段时间内所达到的最低温度,就需要一个最低温度表;如果想知道最高温度,则需要一个最高温度表。(分号后面的句子省略了与前面句中相同的部分,以免重复,写全应为: if we wish to know the highest temperature reached during a period of time we need a maximum thermometer.)

496. In the power plant the energy of running water or that in fuel is turned into electrical energy, which in turn can be changed, if necessary, into mechanical energy.

发电站把流水或燃料的能量转变为电能,电能又能按需要转变为机械能。(if 后省略了 it is. it 代替上句。)

497. That part of the magnet which turns toward the geographical north is designated the north-seeking or plus pole and the part which points southward, the south-seeking or minus pole.

磁铁指向北级的那一端称为指北级或正级,指南方的那一端称为指南极或负极。(the south-seeking ... 前面的逗号表示省略,即省略了谓语 is designated。)

498. One light year is the distance light travels in 1 year at its velocity of slightly more than 186 000 miles/sec.

一光年就是光以略大于每秒 186 000 英里的速度一年时间所通过的距离。(light travels ...

是定语从句，句首省略了 through which。)

499. The price of the cable necessary to carry a current of 500 amperes for one mile would be thousands of pounds. It is clear that if possible this expense must be avoided.

把 500 安培的电流输送 1 英里所需要的电缆，其价格可达数千英磅。显然，如有可能，应当节省这笔费用。(if possible 是省略条件句。形容词短语 necessary ... mile 作定语，修饰 cable。)

500. It must be noted at the outset that metallic conduction, whether electrical or thermal, is a function of the transfer of free electrons.

在一开始就必须注意，金属的传导性，不论是导电性还是导热性，都是自由电子的传递作用。(whether 引导让步状语从句，句中省略了 it is, it 代替 conduction。)

501. The earth is neither the closest to the sun (Mercury) nor the farthest away (Pluto); the largest (Jupiter) nor the smallest (Mercury); the fastest spinning (Jupiter) nor the slowest (Venus). But it is the only planet that we know harbors life.

地球既不是最靠近太阳（水星靠得最近），也不是最远离太阳（冥王星离得最远）；既不是最大（木星最大），也不是最小（水星最小）；既不是运行得最快（木星运行最快），也不是最慢（金星运行最慢），但地球是我们所知惟一的庇护着生命的行星。(在几个形容词最高级前均省略了 is。)

第五难点 倒装语序



英语句子结构通常语序是：主语—谓语—宾语。这种语序称为自然语序。如果谓语在前，主语在后，或宾语在谓语之前，就叫做倒装语序。如果只是谓语的一部分（助动词、系动词、情态动词等）放在主语前面，其余部分仍在主语后面，则叫做部分倒装语序。经常见到的倒装语序多是部分倒装。使用倒装语序有三种情况：（1）主观上为了强调句中某个成分；（2）客观上句子结构本身的需要；（3）某些词习惯上固定的用法。

倒装语序有下列几种情况：

（1）主观上被强调成分的倒装：强调表语、宾语、状语、部分谓语等。

（2）客观上句子结构本身要求倒装语序：

1) 避免头重脚轻；

2) 被修饰语与修饰语靠近使结构紧凑。

（3）某些词或某些语法结构习惯上固定用法：

1) 疑问句；

2) 句首有某些表示否定意义的词：如 not, no, never, hardly, seldom, scarcely, neither, nor, nowhere, in no way, no longer 等；

3) hence, only, so, here, then 等词位于句首；

4) the more . . . , the more . . . 句型；

5) there be 句型；

6) than 引导的比较状语从句；

7) 某些让步状语从句：no matter how, however 等、as 或 though 引导的让步状语从句和不用连词的让步状语从句；

8) as 或 just as 引导的方式状语从句；

9) 省略 if 的虚拟条件句；

10) 与 Just as 引导方式方法状语从句相呼应，so 引导的主句。

倒装语序在句中分析与翻译的实例

502. on the other side of the visible spectrum lies the region of infrared radiation; these are longer wavelengths mostly observed through their heating effects, and therefore often called 'heat radiation'.

可见光谱的另一端是红外辐射区，其波长较长，主要通过它们的热效应来观察，因此，人们常称之为“热辐射”。（主语是 the region . . . ，谓语是 lies，地点状语是 On the . . . side of . . . ，状语提前，主谓倒装以示强调。）

503. Also present in solids are numbers of free electrons, so called because they are temporarily detached from atoms.

在固体里也有很多自由电子，之所以称为自由电子，是因为它们暂时脱离了原子的束缚。（主语 numbers of free electrons 放在谓语 are present 之后，以便与后面修饰 free electrons 的分词短语靠近，否则会产生误解。）

504. Although the existence of infrared radiation was realized well over a century ago, only in the last two decades have applications been wide spread.

虽然在一个多世纪以前人们就已经认识到了红外辐射的存在，但只是在近 20 年来它才得到了广泛的应用。（以 only 开头的主句是倒装结构，applications 是主语，have been spread 是谓语，这里 wide 是副词。）

505. Of importance also are the separation of white light into its constituent colors, the nature and types of spectra, interference, diffraction, and polarization phenomena.

白光分离出各种组成色、光谱的性质及其类型、干涉、衍射以及偏振现象等也是很重要的。（主语是 the separation, the nature and types, interference, diffraction and ... phenomena, 把表语 of importance 提前以示强调。）

506. Not until the materials capable of withstanding strong stresses and high temperatures had been produced could earth satellites be made.

直到把能够经受强压力和耐高温的材料生产出来以后，地球卫星才得以制造出来。（主句中主语是 satellites, 谓语是 could be made. Not 在句首，主句主谓语要用倒装语序。）

507. So great are the electrical charges involved that a lightning flash may extend five miles from cloud to earth.

云层含有的电荷量是如此巨大，以致闪电可从云层到地面延伸 5 英里长。（与 So ... 呼应，that 引出结果状语从句。表语 great 提前，以示强调。）

508. Among the hills is a great reservoir and right below it stands a large electro-power station which supplies hundreds of megawatts of electricity to far away places.

在群山中有有一个大型水库，就在水库下面有一座大型电站，它给遥远地区输送数百兆瓦电能。（第一句中主语是 reservoir，谓语是 is among ...；第二句主语是 a large electro-power station，谓语是 stands，主谓倒装使 station 紧靠着 which 引出的定语从句。）

509. We even speak of acceleration when the car goes around a corner at constant speed – because a change in the direction of a motion requires a force just as does a change of speed.

当汽车以不变的速度拐弯时，我们甚至也认为是个加速度问题，因为改变运动的方向也像改变速度一样需要有力的作用。（以 as 或 just as 引导的方式状语从句有时用倒装结构。谓语 does 代替上句中的实义动词及其宾语 requires force。）

510. Only when all the forces are conservative is the mechanical energy of a system conserved, and only when work is done against a conservative force is there an increase in potential energy.

只有当系统中所有的力皆为保守力，此系统的机械能才是守恒的，只有对某一保守力做功时，才能提高位能。（由于 only 放在句首，所以主句中的主谓语用倒装结构。energy 是主语，谓语是 is conserved；increase 是主语，谓语是 there is。when 引导的从句有条件的意味。）

511. Only now have a substantial number of people become concerned about trends in the growth of the human population and the consumption of natural resources, and with this concern fears for the future are increasingly expressed.

直到如今很多人才开始关注人口增长和自然资源消耗的趋势，由于这种关注，人们对未来愈感担忧。（Only 位于句首要用倒装语序。主语是 a number of people，谓语为 have become。with this concern 表示原因状语。）

512. But it should be remembered that so great have been geological changes, that nowhere on earth today do we find the crust in its original form.

但是应当记住，已经发生了很大的地质变化，因而在地球任何地方我们都找不到原始形式的地壳了。（nowhere 位于句首，句子要用倒装结构，we 是主语，do find 是谓语。）

513. The Americans began to call the wireless the radiotelegraph. From this came the word “radio”.

美国人开始把 wireless 称为 radiotelegraph（无线电报），由此而演变出“radio”（无线电）

这个词。

514. In speaking of an electrostatic field and electrostatic forces it must be kept in mind that we are dealing with charges at rest, hence comes the qualifying term “electrostatic”.

在谈到静电场和静电力时必须记住，我们研究的是静止的电荷，因此就有了“静电”这个修饰词。(hence 后面的 comes 是谓语，主语是 term。)

515. We are very careful never to speak of a compound substance as a mixture, nor do we call a mixture a compound.

我们特别要注意，既不要把化合物说成混合物，也不要把混合物叫做化合物。(不定式短语 never to speak of ... 作状语，说明 careful。第二分句以 nor 开头，表示否定句的连续，部分倒装。)

516. Nevertheless the difference between a good and a bad conductor is so enormous, that for our present purpose we need hardly take into account the feeble conducting power of a bad conductor.

虽然良导体与不良导体之间的差别是很大的，但是对目前的实际应用来说，我们无需考虑不良导体的这种微弱的导电能力。(take ... into account, “考虑”。take 的宾语是 power。)

517. Aluminium remained unknown until the nineteenth century, because nowhere in nature is it found free, owing to its always being combined with other elements, most commonly with oxygen, for which it has a strong affinity.

铝总是和其他元素结合在一起，最常见的是和氧结合在一起，因为铝对氧有很强的亲和力。因此，在自然界任何地方都找不到处于游离状态的铝，直到 19 世纪铝才为世人所知。(nowhere 位于句首主谓语要倒装，is it found ...。)

518. Not only can temperature and light affect the conductivity of semiconductors, but also the addition of impurities to semiconductors will make it change greatly.

不仅温度和光照对半导体的电导率有影响，给半导体渗进杂质也会显著改变它的电导率。(Not only 位于句首句子要倒装，主语位于 can affect 之间。)

519. The commercial communications space satellites made possible “live” commercial television broadcasts of events in Europe and increased by more than one-third the telephone capacity across the Atlantic.

商用通信卫星使对欧洲时事新闻作商业性的电视实况广播成为可能，而且使横跨大西洋的电话容量也增加了1/3多。(make sth. possible, broadcasts...是make的宾语，possible为宾语补足语。)

520. Not until the early part of the nineteenth century was it realized that all the so-called natural organic compounds contain carbon as a constituent element.

直到19世纪初期，人们才认识到所有这些所谓的天然有机化合物都含有碳这一组成元素。(Not until放在句首，要用倒装语序。)

521. Modern geology has for its aim the deciphering of the whole evolution of the earth from the time of the earliest records that can be recognized in the rocks to the present day.

现代地质学以阐明地球整个演变过程作为目的。这个演变过程可以从远古时代至今留在岩石上的记录辨认出来。(have sth. for one's aim, “把……作为目标”。句中把have的宾语the deciphering...放在for...aim之后是宾语部分太长。from the time...to the present day用作evolution的定语。)

522. Galileo took a glass bulb with a long neck, warmed it, and stuck it upside down in water. As the temperature changed so did the level of the water. This was the earliest known thermometer.

伽利略拿一个带有长颈的玻璃泡，把它加热，然后倒着放入水中。当温度变化时，(玻璃管中的)水位也相应变化，这就是最早的所谓温度计。(so did the level...是倒装语序，did代替changed。)

523. Additional errors are, of course, connected with faulty reasoning; but so widespread and serious are the consequences that may arise from this source that they deserve separate treatment in the following unit.

当然，另外一些错误与错误的推理有关，由此而产生的后果是如此普遍、如此严重，因而

有必要在下一单元里对这些错误的后果分别加以讨论。(so ... are the consequences 是倒装结构。与 so ... 相呼应, 第二个 that 引出结果状语从句 they deserve separate ..., 而 that may arise from this source 是定语从句, 修饰 consequences。)

524. Not only is water more important to man than food, but without it he cannot grow crops, run factories, wash himself and his clothes, or keep his home clean.

水对人来说比食物更为重要, 不仅如此, 没有水便不能种庄稼、开工厂、洗澡和洗衣, 或保持室内清洁。(is water ... important ... 是倒装语序。)

525. Experimentation, however, shows a quantitative study of some aspect of nature, and the important part of such a study is the measurement of the things with which it deals.

但是, 试验是对自然界某个方面的定量研究, 而对所试验的事物进行测量是这一研究的重要部分。(第二并列分句中的主语是 the measurement, 谓语是 is the important part, 主谓倒置, 以便主语的说明语 of the things 靠近修饰它的定语从句。)

526. Aluminum is very light; iron is strong, but very seldom does a single metal have all the properties needed for a particular job.

铝很轻, 而铁强度高, 但是很少有一种金属具有某一特殊用途所需的一切性能。(主语是 metal, 谓语是 does have。seldom 放在句首, 句子要倒装。)

527. This is the way Nature takes her toll for our carelessness. So quietly does she do it that often the farmer does not have any idea of what is happening.

这就是大自然对我们粗心大意的惩罚。她静悄悄地做着这一切, 而农民往往觉察不出身边正在发生的变化。(so 引出的是倒装句, so + 副词开头的句子, 多用倒装语序。that 引出结果状语从句, 与主句中 so 相呼应。)

528. For many years man has pondered on the problem of the structure of the universe and only recently has he developed a plausible explanation.

多少年来人们一直在思考着宇宙结构的问题, 只是在最近才提出了一种似是而非的解释。(only 开头的句子一般要用倒装语序。主语是 he, 谓语是 has developed。)

529. At the power stations are step-up transformers which receive electric power at from 2 300 to 11 000 volts and step it up to from 50 000 to 220 000 volts for the transmission line.

电站里有升压变压器，它输入 2 300~11 000 伏的电压并把它升高到高压输电线所要求的 50 000~220 000 伏。(主句是倒装结构，主语 transformers 后置，以便靠近它的定语从句。)

530. Here was a tremendous amount of energy – the potential energy of the waterfall and kinetic energy of the flowing stream.

这里有巨大的能量——瀑布的位能和流水的动能。(here 位于句首，主谓要倒装。)

531. The universe is a large place. The Greeks were well aware of this, but not until the seventeenth century did it become possible to find out the scale upon which the Solar System is built.

宇宙是非常大的。希腊人以前曾清楚地意识到这一点，但是直到 17 世纪才有可能发现太阳系具有多大的规模。(在 not until ... 开头的句中一般要用倒装语序。句中 it 是形式主语，真正主语是不定式短语 to find out ...，谓语是 did become possible。)

532. Not only will the reader find described and illustrated a good selection of the most significant trees of the world but also much about the no less wonderful story of the diversity of their life histories and the rules played by trees in the communities of plants and animals which they do so much to compose.

读者将不仅可以看到世界上绝大多数图文并茂的分类树木，同时可以读到许多树木生活史的奇异而优美的故事，以及树木在组成动植物群落中所起的巨大作用。Not only 位于句首时，该句要用倒装语序。will find 有三个宾语 selection、much 和 rules。这三个字分别由 not only, but also 和 and 连接起来。介词短语 about ... histories 作定语修饰 much，它是名词，作“许多”、“大量”解。played by ... compose 是过去分词短语作定语修饰 rules。)

533. An atom is composed of three principal parts; and the outer parts, namely, the electrons, play the same part as the planets in a solar system. Hence the name planetary electrons.

原子是由三种基本粒子组成的；最外部的基本粒子即电子起着与太阳系中的行星同样的作用，故有行星电子之称。(Hence 后省略了谓语 comes，该句是倒装句，主语是 name, planetary electrons 是 name 的同位语。)

534. We must look hard at very simple and idealized motion to obtain a real understanding of the basis of dynamics. Then, and only then, will we be ready to apply dynamics to the ordinary complex world.

我们必须认真研究很简单的理想化的运动，以便真正理解动力学的基本原理。那时，只有那时，我们才能随时把动力学应用于通常的复杂情况。（will we be ready 是倒装语序，因为 then 位于句首。）

535. A widely known achievement of radio electronics is electronic calculating machine that can perform several thousand arithmetical operations in one second.

电子计算机是无线电电子学的一项人所共知的成就，这种计算机一秒钟能进行数千次运算。（主句为倒装结构。主语 electronic calculating machine 放在谓语 is an achievement 之后。）

536. This has been accepted in the world as our standard unit of mass. Very seldom do we really measure masses in this way.

世界上已把这作为质量的标准单位，可是实际上我们却很少用这种方法来测量质量。（seldom 位于句首，句子要用倒装语序，we 是主语，do measure 是谓语。）

537. A thermometer put in the water can tell us the temperature of the water, but in no way does it show the amount of heat the water contains.

放在水中的温度计能测出水温，但是它决不会指示出水中含有的热量。（in no way 放在句首，要用倒装语序。it 是主语，谓语是 does show。）

538. Research in the past fifteen years has revealed a great deal about the nature of resistance, but in no single case have we been able to overcome it completely.

过去 15 年的研究已经揭示了抗药性的许多特点，但在任一情况下我们都未能完全克服抗药性。（in no case, “决不”，“在任何情况下也不”，否定词放在句首，该句语序要倒装。主语为 we, 谓语为 have been。）

539. Just as short wave broadcasting plays a small but significant part in radio, so does closed circuit transmission in television.

正如短波广播在无线电中起的作用较小、但却很重要一样，闭路传送在电视中的情况也是如此。(does 代替前面的 plays a ...part, 主语是 transmission。)

540. With the increase in the number of metals came an increase in the number of their alloys.
随着金属品种的增加，金属合金的品种也增加了。

注：next, hence then 放在句首可用倒装语序，它们引导的句子，谓语多用 come 或 follow。在没有 then 与 hence 的情况下，用 come 作谓语，其词汇意思是 occur, happen 时，常用倒装语序。示例如下：

(1) Radio waves are the longest, then come radiant heat waves, and then visible light.
无线电波最长，热辐射波次之，可见光再次之。

(2) Then came the Second World War. The great dream of space flight was debased.
后来爆发了第二次世界大战，宇宙飞行这一伟大的梦想就成了泡影。

(3) Next came the idea of depositing: these circuits by evaporating the metal at high temperature in a vacuum.

紧接着产生了这样一种想法：在真空中通过高温蒸发金属来沉积这些电路。

541. Among the great variety of inorganic materials are, for example, the gases of the atmosphere, waters, rocks, minerals, metals and their oxides and salts, non-metals and their compounds, and so forth.

例如，在各种各样的无机物中有空气、水、炭石、矿物、金属及其氧化物和盐类，非金属及其化合物等等。(主语是 the gases of ...一直到句末，有 8 个并列主语。谓语是 are among... materials。主谓倒装，避免头重脚轻。)

542. Yet light though air is when compared with an equal volume of water, air is surprisingly heavy in large quantities.

虽然与同体积的水比起来空气很轻，但大量的空气却是重得惊人。(形容词 + though + 主语 + be 是一种倒装句型。)

543. The form of matter made up of two or more materials not chemically combined we call mixture.

由两种或两种以上的物质组成的、但不是化合成的这样一种物质形式，我们称之为混合

物。(the form of matter ...是谓语 call 的宾语。)

544. Upon the success of plant breeding depends the effectiveness of many other efforts to provide adequate food supplies for direct consumption by man, feed for his animals and agricultural raw materials for his industries.

人们努力提供足够数量的食物供人类直接消耗，为牲畜提供饲料，为工业提供农业原料，但是这些努力的有效性都取决于育种工作的进展。(本句为简单句，倒装语序，主语为 the effectiveness, 谓语为 depends, Upon the success ...为 depends 要求的介词短语。为了强调把 upon ...提到句首。to provide ...industries 不定式短语作 efforts 的定语。to provide 有三个并列的宾语: food supplies, feed 和 materials。)

545. Simple harmonic motion is encountered in the study of sound, light, and electricity, and for this reason should be given very careful consideration by the student.

学习声学、光学和电学时都要遇到简谐运动问题，因此，学生应当仔细地研究它。(consideration 是主语，谓语是 should be given, 倒装以示强调。)

546. Therefore, were it not for the dust in the air, we should not be able to live on this earth of ours, since without dust there would be no clouds and no rain.

因此，如果空气中没有灰尘，我们就不可能生活在我们这个地球上，因为没有灰尘，就没有云，也不会有雨。(were it not for ...是省略 if 的虚拟条件句，等于 If it were not for ...。)

547. At about 800°C, not only will a permanent magnet completely lose its magnetism, but the hot iron will not be attracted by a magnet.

大约在 800°C 时，不仅永久磁铁将完全失去磁性，而且炽热的铁也不再受磁铁的吸引。(主语 a permanent magnet 放在谓语 will 和 lose 之间，是部分倒装。)

548. Radar cannot resolve detail as well as the eye, nor is it yet capable of recognizing the color of objects to the degree of sophistication of which the eye is capable.

雷达既不能像人的眼睛那样分辨出细节，也不能像人的眼睛那样清楚地识别出目标的颜色。(nor 在句首表示连续否定，前面的句子是否定句，后面才能用 nor。主语是 it, 谓语是 is capable of ...。)

549. Sir Isaac Newton was one of the pioneers in investigating viscosity, and on his analysis depends the definition of the coefficient.

艾萨克·牛顿爵士是研究粘度的先驱者之一，粘性系数就是根据他的分析下的定义。(第二句主语 definition 置后，而把宾语 on his analysis 提到谓语 depends 前面，加以强调。)

550. Important physical properties for distinguishing one gas from another are color, odor, density, and solubility.

颜色、气味、密度和溶解度是一种气体区别于其他气体的重要物理特性。

551. In Fig. 3 are shown the paths of selected particles, their positions and the wave shape at two different times.

图3表示出了选出的粒子的轨迹、位置和两个不同时间的波形。(In Fig. 3是地点状语，把它放在句首，以示强调，后面的主谓语也采用倒装结构。)

552. So profound and clear was Newton's understanding, that he was able to apply the laws of motion successfully to an astonishing number of phenomena, from the movement of the planets to the rise and fall of the tides.

牛顿的理解力深刻而透彻，所以他能够把三大运动定律成功地用来阐明大量的自然现象，从行星的运动到潮汐的涨落。(开头主句是倒装结构，表语 profound and clear 提前以示强调。主语是 understanding，谓语是 was profound and clear。与 so 相呼应，that 引出结果状语从句。)

553. Of particular interest now are the electrical effects that lead to an understanding of electromagnetic waves and the many phenomena of modern physics.

目前人们对各种电效应特别感兴趣，因为这些效应有助于理解电磁波和近代物理学中的许多现象。(主句用倒装语序，表语 of ... interest 提前以示强调。)

554. Indeed, only recently, with a greater understanding of the properties of atoms and through the explorations of the atmosphere with research rockets, has a clear picture of the earth's magnetism begun to emerge.

的确，只是近来随着对原子性能的深入了解以及通过探测火箭对大气层的考察，人们对地

磁才有了一个清晰的概念。(本句是倒装结构, 主语是 picture, 谓语是 has begun。)

555. Nowhere in the whole domain of the motions of the natural world, here on earth or in the skies, in our large-scale machines or in our means of transport, have we yet found any case to which the analysis of mechanics does not apply.

在地球上, 在空中, 在大型机器或运输工具中, 在自然界的所有运动领域里, 我们还没有发现任何用不到力学分析的情况。(句首有表示否定意思的词 nowhere, 通常要用倒装结构。主语是 we, 谓语是 have found。)

556. The stratosphere ends at about 100 kilometers, and above it comes the ionosphere, extending up to some 400 kilometers. Beyond this again comes the outermost layer, the exosphere, which gradually tails off into true space.

同温层最高大约到 100 公里, 往上便是电离层, 它向上延伸约 400 公里。再往上便是最外面的一层, 即外逸层, 它逐渐消失而进入真正的太空。(第一句中 comes 的主语是 the ionosphere。第二句中 come 的主语是 the outermost layer。两句都是主谓倒装。)

557. We have seen already that the chemical energy stored in food can be changed into kinetic energy; so can the chemical energy stored in petrol or coal.

我们早已知道, 储存在食物中的化学能可以转变为动能; 储存在石油或煤中的化学能也是如此。(so 引导的句子是倒装句, 主语是 the chemical energy, 句末省略了 be changed into kinetic energy。)

558. Although perhaps only 1 per cent of the life that has started somewhere will develop into highly complex and intelligent patterns, so vast is the number of planets that intelligent life is bound to be a natural part of the universe.

尽管起源于某处的生命或许只有 1% 能发展成高度复杂的智慧型生命, 但是行星的数目是如此之多, 因此, 智慧型生命必然是宇宙的自然组成部分。(so vast is ... 为倒装语序, 主语 the number of ... is vast 是系表结构。)

559. Neither will an ordinary explosive explode unless we produce a sufficiently strong perturbation of its molecular structure either by heating it or by subjecting it to a powerful mechanical im-

pact.

除非我们把炸药加热或使其受到强烈的机械碰撞来剧烈扰动炸药的分子结构，否则普通炸药是不会爆炸的。（以 neither 开头的句子一般要用倒装语序。主语是 explosive，谓语是 will explode。）

560. Had the horse been pulling the wagon up the hill, the force exerted by the horse would have been the sum of two amounts, namely, the force to overcome friction and the force to overcome the component of the weight along the surface of the road.

如果一匹马向山上拉一辆四轮马车，马用的力就是两个力之和，即克服摩擦的力与克服马车重量沿道路表面的分力之和。（had the horse been pulling the wagon . . . = If the horse had been pulling the wagon）

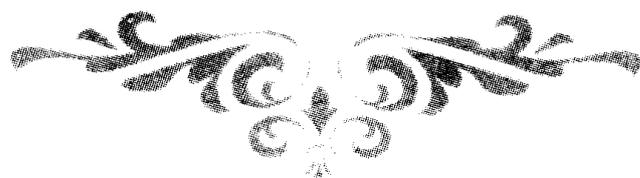
561. It is worth while to remember, however, that Eq. (H) is the general definition of the work done by a force, only if the force is constant and in the same direction as the displacement, is it true that “work equals force times distance”.

但是，值得记住：方程式 (H) 是力做功的一般定义，只有当作用力是不变的而且与位移的方向一致时，“功等于力乘以距离”才能成立。（be worth while, “是值得的”。不定式短语 to remember . . . 在句中作主语，it 是形式主语。that 引导宾语从句。is it true that . . . 是倒装句，it 是形式主语，代替 that 引导的主语从句，is true 是谓语。）

562. Nature had indeed been bountiful in providing such an allpurpose raw material, but we should never have found it so useful were it not for the ingenuity and success of the technologist in the exploitation of its latent possibilities.

在提供各种用途的原材料方面，自然界的确是很慷慨的，但是如果技术人员在挖掘原材料的潜力方面所发挥出来的创造性以及所取得的成就，我们就不会知道这些原材料有这么大的用处。（were it not for . . . = if there were no）

第六难点 虚拟语气



虚拟语气表示人们的主观欲望或假想的虚拟情况，或表示一种委婉的语气。条件从句有两种：一种是假设的情况是真实的，完全有可能发生的这种条件句叫真实条件句。另一种是假设的情况根本不可能存在，或假想的情况发生的可能性很小，这种条件句叫虚拟条件句。

虚拟条件句有下列几种情况：

(1) 虚拟语气谓语动词的基本形式：

- 1) 表示与现在事实的相反假设；
- 2) 表示与过去事实的相反假设；
- 3) 表示与将来事实的相反假设。

(2) 省略 if 的倒装虚拟条件句：在 if 引导的条件状语从句中有 were, had 和 should 时，可将 if 省略，而采用倒装语序，其结构如下表。

	从 句	主 句
现在	Were there no + 主语 Were it not for + 主语	would (could, might) + 动词原形
过去	Had + 主语 + 过去分词 Had it not been for + 主语	would (could, might) + have + 过去分词
将来	Should + 主语 + 动词原形 Should there be + 主语	would (could, might) + 动词原形

(3) 错综时间虚拟条件句。

这种虚拟条件句，条件从句和主句中的动作发生的时间不一致。如：从句中动作是过去，而主句中的动作是现在。如：If he had followed the doctor's advice, he would be quite right now. 条件从句中谓语表示过去，而主句中谓语表示现在。

(4) 用于表示欲望、建议、要求等动词后的宾语从句。

(5) 用于主语从句。

(6) 用于某些状语从句：

- 1) as if, as though 引导的方式方法状语从句；
- 2) although, even if though, no matter how... 引导的让步状语从句；
- 3) so that, in order that 引导的目的状语从句。

(7) 情态动词 would, should, could, might + have + 过去分词结构。

(8) 与下列词连用，要用虚拟语气：

- 1) wish: ① I wish that I knew his address. (现在)

②I wish that I had not lost my bike. (过去)

- 2) if only: If only he had seen me!
- 3) it is (high) time (that) ...: It is (high) time (that) we went home.
- 4) would rather (that) ...: I would rather that he painted it blue.
- 5) but for: But for the rain we should have had a pleasant journey.
- 6) but that: He would have helped us but that he was short of money at the time.
- 7) otherwise: She had intellect, otherwise I should have scorned her.

虚拟语气在句中分析与翻译的实例

563. It is therefore necessary that the theoretical sections of the book be carefully studied and thoroughly understood.

因此，有必要仔细地研究并透彻地理解本书的理论章节。(be studied and understood 是主语从句中的谓语，是虚拟语气。)

564. A computation which would have taken years of human work in the past, is now done in a few seconds with the help of computers.

过去需要人工作几年的运算，现在借助计算机几秒钟就完成了。(would have taken 表示对过去发生的事进行的一种推测。)

565. If there were no friction then the output would equal to the input and the machine once began to run would be in a state of perpetual motion.

如果没有摩擦，那么输出就会等于输入，机器一旦开始运转，就会处于永恒运动的状态。(If there were no... 表示与现在事实相反的假设。)

566. Any moving object, whether it be a lever, a pulley, a wheel and axle, possesses the energy of motion, which we call kinetic energy.

任何运动的物体，不论是杠杆、滑轮、轮子还是轴，都具有运动的能量，我们把这种能量称为动能。(whether 引导的让步状语从句是虚拟语气，be 用原形。)

567. Today it is of prime importance that the inch and the pound used in one shop manufacturing parts for a machine be exactly the same as the inch and pound used in another shop.

在生产机器零件的一个车间里使用的英寸和磅，应与另一车间里所使用的完全相同，现在这个问题具有头等重要性。(在 that 引导的主语从句中，谓语 be the same... 是虚拟语气。)

568. In as much as the basis of practically all military instruments is the telescope, it is of the greatest importance that the fundamentals of the telescope be completely understood before consideration is given the other devices.

因为望远镜实际上是一切军事仪器的基础，所以在介绍其他装置之前，全面地了解一下望远镜的原理是非常重要的。(in as much as 或 in as much as, “由于”，“因为”。be understood 是不定式原形被动形式，虚拟语气。)

569. It should be pointed out that in order to be able to speak of the pressure or the temperature of a gas (or of any other body) it is necessary that all parts be at the same pressure or temperature.

应当指出，为了能够谈论某种气体（或其他任何物体）的压力和温度，其所有部分的压力和温度必须相同。(在 it 作形式主语，that 引出主语从句的场合，主语从句中的谓语有时可用虚拟语气，谓语一般用动词原形。)

570. Should you now apply more force, the car would increase its momentum in direct proportion to the increase in applied force.

如果你现在加的力更大一些，那么汽车的动量将会与作用力的增量成正比地增加。(Should you... 是省略 if 的虚拟条件句。)

571. Part of the scientific method is the requirement that the investigator be willing to accept all of the facts.

科学方法的要点就是要求研究人员乐于接受一切事实。(that 引出 requirement 的同位语从句，be willing 是虚拟语气。)

572. Without government support, for example, Darwin would have not sailed around the world, or had available the collections of specimens he needed in forming his theory of evolution by natural selection.

譬如，如果没有政府的支持，达尔文就不可能作环球旅行，也不可能收集建立他的通过自

然选择的进化论所必需的标本。(without...support 作条件状语。would have not sailed 是虚拟语气，表示对过去发生事情的猜测。had 的宾语是 the collection，形容词 available 是 had 要求的宾语补足语。通常宾语补足语应放在宾语之后，而本句却放在宾语之前，因为宾语的修饰语太长。he needed...selection 是省略 that 的定语从句，修饰 specimens。)

573. The ball would remain exactly where it is forever, were it not acted upon by some outside influence.

如果球不受外来的影响，它就会一点不差地停留在它原来所在的地方。(were it not acted... = if it were not acted...。)

574. When two objects fall so quickly that it is very difficult to decide whether one reaches the ground before the other. It is therefore desirable that the weights be dropped from a considerable height.

当两个物体快速下落时，很难确定哪一个先落地。因此，这需要重物从相当高的地方向下落。(It is + 某些形容词 + that..., that 引导的主语从句，为虚拟语气，谓语 be 要用原形。)

575. If it were not for ionospheric layers, long distance radio communication would have required very complex line-of-sight relay stations something like the microwave-TV transmission systems in use today.

如果没有电离层，那么远距离无线通信就需要很复杂的视距信号中继站，像现在使用的微波发射电视系统那样。(If it were not for... 是虚拟语气，表示与现在事实相反的假设。)

576. What a catastrophe it would be should the steam engine, the electric motor, the telegraph and the telephone be removed at a moment's notice.

如果蒸汽机、电动机、电报和电话突然全部拆走，那将是一场多么大的灾难。(should the steam engine...be removed... = if the steam engine...should be removed...。if 引导的从句表示与将来事实相反的假设。at a moment's notice, “突然”，“马上”。)

577. The sum of the kinetic energy and potential energy of the system is always the same, provided the system be not acted upon by anything outside it.

假定某一系统不受任何外力作用，那么这个系统的功能和位能之和就一直是相同的。(provided 引导的条件从句用的是虚拟语气，谓语用动词原形 be...acted。)

578. In 1900, we all would have agreed that the ash and smoke and gases from the flame weighed exactly what the paper and air weighed to begin with.

在 1900 年，本来我们都会同意这一看法：火焰生成的灰烬、烟和气体的重量正好等于纸和空气在开始燃烧时的重量。(would have agreed 为虚拟语气，表示与事实相反的假设。)

579. It is essential that a single standard be used in measuring a given quantity so that a scientist in one part of the world can use with confidence the results of measurement made by other scientists elsewhere.

在测量给定量时，要采用统一的标准，以便世界某一地区的科学家能够有把握地利用别处的科学家们所作出的测量结果，这一点是非常重要的。(It is essential that... that 引导的主语从句为虚拟语气，谓语用原形 be used。)

580. If we could place a body whose mass is 1 lb. in a rocket and send it 100 miles above the earth's surface, its inertia and its mass would still be exactly 1 lb.

如果我们能把 1 磅质量的物体放进火箭并把它发射到离地球表面 100 英里的高空，该物体的惯性和质量仍然正好是 1 磅。(If we... 为虚拟语气，表示与现在实现相反的假设。)

581. To fully understand the various steps in the forging process, it is necessary that a study be made of some of the fundamental actions of plastic metal when subjected to deformation by pressure.

为了充分了解锻压加工过程中的各个步骤，有必要研究一下塑性金属受到压力变形时所发生的一些基本反应。(that 引出的主语从句中，be made 是虚拟语气，of some...of plastic metal 是 study 的定语。)

582. In the year 1900 every physicist in the world would have told you that we cannot make new energy – we can only use energy which exists already.

在 1900 年，世界上任何一位物理学家本来会对你说，我们不能创造新的能量，我们只能利用已存在的能量。(would have told 表示与事实相反的假设“本来会对你说……”，但实际上

并未说。)

583. During past ages dramatic changes have taken place inside the earth. Indeed, it is likely that without these changes life could never have originated on the earth.

在过去的年代里，地球内部已经发生了重大的变化。实际上，如果没有这些变化，地球上大概永远不可能有生命的起源。(could...have originated 表示与事实相反的假设，实际上“有生命的起源”。)

584. Though no one would admit to believing that modern science is a magic wand to be waved over a poor country to convert it into a rich one, not a few seem to act as if it were true.

尽管没有任何人相信现代科学是根魔杖，在穷国上空挥动一下不可能把它变为富国，但确有一些人觉得这似乎有可能成为现实。(act as if, “表现得似乎……”。as if 引导的从句要用虚拟语气)。

585. Whatever its underlying reasons, there is no doubt that much of the pollution caused could be controlled if only companies, individuals and governments would make more efforts.

不论污染的根本原因是什么，毫无疑问，只要各大公司、个人和各级政府都能作出较大的努力，所造成的大部分污染是可以加以控制的。(Whatever 引导让步状语从句，谓语 may be 省略了。在这种结构中 may be 经常省略。句中主语为 reasons, whatever 是 may be 的表语。that 引导的是 doubt 的同位语从句。过去分词 caused 作定语，修饰 pollution。同位语从句及其条件从句中谓语是虚拟语气，表示这种可能性很小。)

586. Should the effort to get steady and controlled ways of releasing nuclear energy be successful, man would have such new and inexhaustible energy sources as sea water and rocks.

如果在探索稳定而可控制地释放原子能的方法方面所做的努力取得成功的话，那么人类将会拥有像海水和岩石这样的取之不尽、用之不竭的能源。(本句是虚拟语气，因为省略了 if, 所以用了倒装语序。如果不省去 if, 可写成 If the effort...should be successful...。由于是部分倒装，形成谓语 should 与 be successful 分隔开。)

587. When you stand on the ground you are pushing down on it with a force equal to your weight, and at the same time the ground must be pushing up on you with exactly the same force.

Or you would fall all the way down to the center of the earth.

当你站在地面上时，你就是在向下对地面施加一个等于你体重的作用力，而同时，地面必然向上对你施加一个大小完全相等的作用力，否则你就会一直掉入地球中心去了。(or, “否则”，其后谓语要用虚拟语气。)

588. In considering the moment of inertia of a body, it is frequently convenient to treat it as if all the mass were concentrated at a single distance from the axis.

在研究物体的转动惯量时，为了方便起见，常常把物体的全部质量都当作集中在离轴一定的距离上来加以处理。(treat...as if..., “把……作为……来处理”。as if 引导的从句是虚拟语气。)

589. Had the scientists not made some experiments to measure how fast sound travels we would not have known that the speed of sound is much less than that of light.

如果科学家们不曾做过测量声音传播速度的实验，我们就不会知道声速比光速慢得多。(Had the scientists not made some experiments... = If the scientists had not made some experiments...)

590. It follows, then, that if there be no movement of electricity between any two points those points must be at the same electrical level.

那么，由此可见，如果任意两点之间没有电荷流动，则这两点必然处于相同的电位。(if there be no = if there were no...)

591. Should another astronaut hang a person in the state of weightlessness on a spring balance in order to weigh him, the pointer would read zero.

如果另外一个宇航员把失重状态的人挂在弹簧秤上来称他的体重，那么指针的读数为零。(= If another astronaut should hang a person...)

592. In order that a body be in equilibrium under the action of any number of forces, two conditions are needed.

在任意(多)个力的作用下，要使一个物体处于平衡状态，需要具有两个条件。(In order that 的目的状语从句，谓语用原形 be, 是虚拟语气。)

593. This does not imply that it did not require genius to make the discovery at that moment, but only that a century earlier not even a Newton or a Leibniz could have done it, and by a century later, even in their absence, the calculus would have been gradually developed by the efforts of many lesser mathematicians.

这并不意味着在那个时候不需要天才就可得到这个发现，而只是说，如果早一个世纪，即使牛顿或尼伯列北都不可能有这样的发现。如果再晚一个世纪，即便没有这两个人，通过为数众多的不著名的数学家们的努力，积分这门学科也会逐渐地建立起来。(imply that...but only that..., 这两个 that 都是 imply 的宾语从句。it 为形式主语，代替 to make... 不定式短语。could have done 是虚拟语气，表示对过去发生的事的一种猜测。lesser 和 less 都是 little 的比较级，less 多指数量，而 lesser 则指价值和重要性。如：less time, “较少的时间”，lesser writer, “次要的作家”。)

594. Aristotle could have avoided the mistake of thinking that women have fewer teeth than men, by the simple device of asking Mrs Aristotle to keep her mouth open while he counted.

亚里士多德曾认为女人的牙齿比男人少，其实很简单，只需请他的夫人张开口让他数一数，他本来是可以避免这一错误的。(could have avoided 表示与过去事实相反的假设，实际上没有避免。)

595. Even if one were to walk along a horizontal floor carrying the weight, no work would be done, since the vertical force has no component in the direction of the horizontal motion.

即使一个人提着重物在水平的地板上行走，也是不会做功的，因为垂直的力沿水平运动方向没有产生分力。(even if 引导的让步状语从句，谓语一般用虚拟语气。句中 were + 不定式是“将要做”或“打算做”的意思，表示对将来行为的一种设想。)

596. Were it not for the new sources of energy being put to use, man would be unable to leave the Earth for other planets.

如果没有可供利用的新能源，人们就不能离开地球到其他星球上去。(were it not for... = if it were not for... = if there were no...。分词短语 being put to use 作定语，修饰 sources of energy。)

597. Efficient functioning depends on good design, careful attention to operating difficulties, and lubrication of rough spots, whether they be mechanical or personal.

高效率的运转取决于良好的设计，取决于细心注意操作中的难点以及粗糙部位的润滑——不论它们是机械方面的，还是个人操作方面的。(whether 引导让步状语从句，谓语 be 是原形，表示虚拟语气。)

598. Before the days of helicopters, the task of building a radio station on top of a high mountain might have meant building a road or a cable railway first.

在直升飞机问世之前，如果要在高山顶上建造无线电台，也许首先要修路和建造缆车道。(might have meant 为虚拟语气，表示对过去的事情的推测。)

599. Yet no one could be more surprised than he would have been to see rockets and jet airplanes zooming across the sky at speeds of many miles a minute, in demonstration of this basic physical law.

在演示这一基本物理定律时，看到火箭和喷气飞机能以每分钟若干英里的速度飞过天空，没有人会比他更感到惊讶。(would have been 是虚拟语气，表示对过去发生的事的一种猜测。)

600. It is a logical assumption that the nucleus is made up of particles. If this be true, then it must also be concluded that there is space between the individual units of nuclear matter.

原子核是由粒子组成的，这是合乎逻辑的假设。如果这个假设成立的话，那么必然也会得出结论，即核物质的各个基本粒子之间存在着空间。(If this be true, If 引导虚拟条件从句，动词要用原形。)

601. If telemetry had been applied sooner, a number of promising aircraft developments might not have been cancelled, some crashes surely would have been avoided, and the reasons for the others ascertained.

如果早些时候采用遥测技术，许多有前途的飞机研制工作就不会被取消，一些飞机坠毁事件本可避免，其他方面的原因亦可查明。(本句是虚拟语气，表示与过去事实相反的推测。)

602. Today we know that, if one ounce of matter could be completely destroyed and changed into energy, it would yield as much power as we derive from burning 100 000 tons of coal in a conventional power station.

今天我们知道，假如一盎司的物质能完全分裂而变为能量，那么它所产生的能量就相当于一个发电站里燃烧 100 000 吨煤所发的电力。(that 引导的是 know 的宾语从句。宾语从句中有

if 引导的条件状语从句，其主句是 *it could...station*。as 引导的句子是定语从句，修饰 *power*。as 在句中是关系代词作 *derive* 的宾语。注意：只有在 *as much (many) + 名词 + as...* 的结构中，as 才能引导定语从句。if 引导的从句及其主句中的谓语都是虚拟语气。）

603. *If the motion of the pistons in the locomotive were to be prevented in some way, no work would be done by the gas in the cylinders no matter how great its pressure.*

如果用某种方法阻止住火车发动机中活塞的运动，则无论气压有多大，汽缸里的气体也不能做功。（此句是虚拟语气。If 所引导的从句中 *were to be prevented* 表示与将来事实相反的假设。让步状语从句末尾省略了 *may be*。）

604. *The hologram serves as a window through which the object can be viewed from different elevations and angles, as though the object were still present.*

全息照片可作为一个窗口，通过它可从不同的剖面和角度看到物体，好像这个物体依然放在那里。（as though 引导的从句谓语往往用虚拟语气。）

605. *If a magnetic pole be placed at some point in a magnetic field that pole will experience a mechanical force and the magnitude of that force will depend upon the strength of the pole involved and also upon the field strength.*

如果把一个磁极置于磁场的某点，那么该磁极将受到机械力的作用，这一作用力的大小将取决于该磁极的强度，同时也取决于磁场的强度。（If 引导的虚拟条件，谓语如为被动态常用 *be + 过去分词*。）

606. *From Lenz's Law we know that neither electrical nor other form of energy can be derived unless an equivalent amount of work be performed.*

根据楞次定律我们知道，如果不做等量的功，就既不能得到电能，也不能得到其他形式的能量。（unless 引导的条件从句谓语用的是虚拟语气。）

607. *The planets, of course, are subject to the force of gravitation. Otherwise, according to Newton's First Law, they would fly off on a straight line into space.*

当然，行星受到万有引力的作用。否则，根据牛顿第一定律，它们就会沿着一条直线飞入太空。（连词 *otherwise* 作“否则”解时，句中谓语有时要用虚拟语气，表示与事实相反的假

设。)

608. Even if a student were to learn all the chemical theory that is known, he would not have a knowledge of the science, because a major part of chemistry has not yet been well incorporated into chemical theory.

一个学生即使打算学完所有已知的化学理论，他也不能通晓这门科学，因为化学理论尚未很好地把大部分化学知识总结进去。(even if 引导的让步状语从句中谓语常用虚拟语气。)

609. Although we believe today that it is actually the negative charges that move in a metallic conductor, it is often convenient to describe a process as if it were the positive charges that moved.

现在我们虽然确信，实际上是负电荷在金属导体中运动，但是为了方便起见，常常把这一过程描述为似乎是正电荷在运动。(it is...that... 和 it were...that... 都是强调句型。as if 引出的方式方法状语从句中，谓语通常要用虚拟语气。)

610. Lord Rutherford made the suggestion that one might think of the atom as consisting of an assembly of an equal number of positive and negative charges of electricity, the latter being known as electrons.

劳德·卢瑟福曾经提出：人们可以认为原子是由数量相等的正负电荷组合而成的，负电荷称为电子。(that 引出 suggestion 的同位语从句，might think of 是虚拟语气。)

611. Highly advanced civilizations may have existed on other planets long before intelligent forms of life evolved on the earth.

也许早在地球上智力生命形式开始进化之前，其他星球上就已有高度文明存在了。(may have existed 表示对过去事情的猜想，其可能性比 might 结构表示的要大。)

612. Suppose that a piece of copper were to be divided again and again until there remained a particle so small that it could not be divided further and still be copper.

假定把一块铜一分再分，一直分到小得不能再分了，但仍然是铜。(suppose that 引出的从句中，were to be divided 为虚拟语气，表示与将来事实相反的假设。)

613. It is important that the problems of water be solved, for as long as men live, water will

continue to be what it is today – next in importance to oxygen.

只要人类生存着，水仍将继续保持它目前的地位——其重要性仅次于氧，因此解决水的问题是至关重要的。(It is important that..., that 引导主语从句，谓语 be solved 是虚拟语气。)

614. As long ago as 1945 an English science-fiction writer, proposed that manned stationary satellites be used to relay and broadcast electromagnetic communication signals.

早在 1945 年，一位英国科学幻想作家就曾建议，使用载人固定卫星来中转和广播电磁波通信信号。(propose 后的宾语从句谓语要用原形 be used, 虚拟语气。)

615. The great speed which the computer now puts at the disposal of the scientist and engineer has made possible a large number of technological advances which would otherwise not have taken place.

计算机给科学家与工程师提供运算的速度是极快的，这就使大批技术成就成为现实，否则，就不可能取得这些成就。(在虚拟语气中，表示肯定往往实际上是否定，而表示否定往往实际上是肯定。句中“不可能取得这些成就”，实际上是“取得了这些成就”。)

616. High efficiency implies that circuit loss be minimum and the ratio of the transistor output, the parallel equivalent resistance, and its collector load resistance be maximum.

高效率意味着电路损耗最小，晶体管的输出转换效率、并联等效电阻及其集电极负载电阻最大。(implies 要求的宾语从句，谓语要用虚拟语气，be 要用原形。)

第七难点 连 词



构成长难句主要有两个因素：一是各种短语，如分词、动名词、不定式、介词和形容词短语；二是从属连词引导的各种复合句。要正确理解长难句，就必须掌握各种连词的用法。英语中连词很多，本章中只着重介绍几个常用的从属连词，如 that, which, as, what, whether, where, while 等。

that 的用法

that 的用法较多，它能引导 7 种句子，6 种主从复合句和强调句型。各种用法之间容易混淆，如：that 引导的主语从句与强调句型；that 引导的定语从句与 that 引导的同位语从句；so that 引导的目的状语从句与其引导的结果状语从句。

that 引导各种句子实例的分析与翻译

617. As centuries passed, many useful and ornamental things were made of glass, and hardly a family could be found that didn't make some use of this substance.

几个世纪过去了，在这期间很多实用的和装饰用品都是由玻璃制造的，因此，几乎找不到一个家庭不使用这种材料。（that 引导定语从句，用来修饰先行词 family，that 在句中作主语。）

618. Modern scientific discoveries lead to the conclusion that energy may be created from matter and that matter, in turn, may be created from energy.

近代的科学发现得出如下结论：物质可以产生能量，能量又能产生物质。（that 引出同位语从句，that 在从句中不作成分。）

619. Since the air is always present, we seldom notice the forces that air exerts unless these forces become so great that they produce inconvenience, discomfort, or destruction.

因为空气总是存在的，所以我们很少注意到空气的作用力，除非这种作用力大得使人感到不便、不舒适或造成了破坏。（so...that..., that 引导结果状语从句。）

620. Astronomers no longer regard as fanciful the idea that they may one day pick up signals which have been sent by intelligent beings on other worlds.

天文学家认为，有一天他们可能接收到从其他世界有智慧的生物发出的信号，这种想法不再是一种离奇的幻想。（that 引导同位语从句。）

621. Newton's discovery of the Law of Universal Gravitation, his understanding of the nature of motion, and his concept of energy, all supported his belief that light consists of particles.

牛顿发现的万有引力定律，他对运动本性的理解以及他对能量的概念，都为他关于光是由粒子组成的这一论点提供了证据。(discovery, understanding 和 concept 均为主句的主语，谓语是 supported。that 引出同位语从句。)

622. The very small amounts of oxygen, nitrogen, and water vapor in the atmosphere of Mars make it unlikely that the planet could support the kind of living things that we know on the earth.

火星大气中微量的氧、氮和水蒸气使火星不大可能维持我们所熟悉的地球上生存的这类生物。(it 是形式宾语，代替 that 引导的宾语从句。)

623. The fact that energy can be changed from one form to another, but can neither be created nor destroyed, constitutes one of the most important laws in science, the law of conservation of energy.

能量可以从一种形式转换成另一种形式，但它既不能被创造出来，也不能消失。这一事实就构成了科学上最重要的定律之一，即能量守恒定律。(连接两个谓语的一部分 created 和 destroyed。that 引导同位语从句。)

624. Many centuries ago the people of ancient China made the discovery that natural magnets have attracting properties and that a freely suspended magnetized bar always points north and south.

很多世纪以前，古代中国人就发现了天然磁铁具有吸引的特性，自由悬挂的磁棒总是指向南北。(两个 that 引出 discovery 的两个并列的同位语从句。)

注：that 引导的定语从句，与其引导的同位语从句有其共同点：即说明某个名词。它们之间有两点差别：①在定语从句中，that 是从句中一个成分，作主语或作宾语，但 that 在同位语从句中却不起任何成分作用。②that 引导的同位语从句，用来揭示主句中某个名词的内容。如：The fact that the earth and the moon attract each other is only one example of a very general law of universal gravitation.

地球和月球相互吸引这一事实，仅仅是万有引力定律的一个实例。(that 引导的同位语从句来揭示 fact 的内容，而不是去修饰它。定语从句用来修饰某一名词的性质，大小，形态等。同位语从句一般可译成“即……”，“这一……”，或者加冒号“:”，也就是说，要把同位语从句译成一个具有独立意义的句子。)

625. It is obvious that the strength of a country's economy is directly bound up with the efficiency of its agriculture and industry, and that this in turn rests upon the efforts of scientists and technologists of all kinds.

显而易见，一个国家经济上的实力直接取决于工农业效率，而工农业效率又要依靠各行各业的科技人员的努力。(It 是形式主语，代替句中两个 that 引导的主语从句。)

626. Galileo had believed Copernican theory that the planets orbited the sun since early on, but it was only when he found the evidence needed to support the idea that he started to publicly support it.

伽利略早已相信哥白尼的学说即行星环绕太阳运行，但只是在他发现了支持这一观点的证据之后，他才开始公开支持这一观点。(it was...that... 为强调句型，用来强调 only when...idea 整个句子。)

627. Iron is the most widely used engineering metal, but it is only when a little carbon is added to it that iron can be of any use in metal constructions.

铁是工程中使用最广的一种金属，但只有在铁中添加一点碳时，铁才能在金属结构中具有一定的用途。(it is...that... 用来强调 only when...to it 整个句子。)

628. It is generally believed by scientists that millions of years ago plant life originated in the water, and that gradually new forms of plant life evolved that could live on land.

科学家们普遍认为，数百万年前，植物生物起源于水中，逐渐又进化出能在陆地生存的植物生命新形式。(It 是形式主语，代替 that ...and that 引导的主语从句，第三个 that 引导定语从句，that 在句中是主语，代替先行词 form。)

629. It is for the purpose of learning from nature that a new science has grown up, called bionics, it is a kind of marriage between biology and electronics.

正是为了向大自然学习，一门称为仿生学的新学科应运而生，它是生物学和电子学的结合物。(It is...that 是强调句型，强调 for... 引出的状语。)

630. It was at the beginning of the nineteenth century that several chemical elements were dis-

covered, and that some of them were found to be able to combine with each other and form compounds.

正是在 19 世纪的初叶, 人们发现了一些化学元素, 并发现其中有些元素能相互化合而形成化合物。(本句是强调句型, 强调介词短语 at...century 表示的时间状语。to be able...compounds 是主语补足语。)

631. The first laser was made in the early sixties, but it was not until laser was used to drill diamonds that the device was accepted as a wonderful tool.

早在 60 年代初期就制造出了第一台激光器, 但是直到激光器用来给金刚石打孔时, 人们才承认它是一种奇妙的工具。(it was...that 是强调句型, 强调 until 引导的状语从句。)

注: 强调句型很容易与 that 引导的主语从句混淆。区别的方法是:

(1) 将句中 It is (was) 和 that 去掉, 必要时把词序适当调整组合, 若仍是一个完整的句子, 则可断定是强调句型。

(2) It 作形式主语的结构中, It is (was) 后面跟的多半是形容词或过去分词, 而强调句型则没有这样的词。试比较:

1) It is the protons that give the nucleus a positive charge.

正是质子使原子核带正电荷。

2) It is known that air has weight.

大家知道, 空气具有重量。

第一句, 如果把 It is 和 that 去掉, 仍然成句子, 所以是强调句型, 强调主语。强调句型只能强调主语、宾语和状语, 不能强调谓语和定语。

第二句, 如果把 It is 和 that 去掉, 则不成句子。因此, that 引导的是主语从句。

632. Work is done only when a force is exerted on a body while the body at the same time moves in such a way that the force has a component in the direction of motion.

只有当力作用于某一物体, 同时使其运动, 而且沿着该物体运动的方向上有力的分量时, 才算做了功。(与 in such a way 相呼应, that 引出结果状语从句。)

633. The world's population is increasing at such a rapid rate that the need for fresh water will be doubled by the end of this century.

世界人口正在迅速地增长, 以致到本世纪末, 对淡水的需求量将增加一倍。(与 such 相呼

应，that 引导结果状语从句。)

634. The direction of the induced current in the moving conductor is such that the direction of the side thrust exerted on the conductor by the magnetic field is opposite in direction to its motion.

运动导体中感应电流的方向使得磁场对此导体所产生的侧向推力与该体的运动方向相反。(such 是形容词，在句中作表语。The direction is such, that 引导结果状语从句。)

635. The world's population is expanding at such a rapid rate that scientists predict there will be more people that our planet can house and feed properly.

世界人口以如此迅猛的速度增长，以致科学家们预言，人口将会多得超过我们地球所能提供正常居住和饮食的限度。(such...that 引出结果状语从句。)

636. The atmosphere is a mixture of substances that have such low freezing and boiling points that they exist as gases through a wide range of temperatures.

大气层是冰点和沸点都很低的各种物质的混合物，所以在较大的温度变化范围内它们呈现为气体。(句中 such 是副词，修饰形容词 low，属于 such...that... 结构。that 引导结果状语从句。)

637. As a railroad car or an automobile passes around a curve some agency must supply a force directed toward the center of curvature in order that the moving body shall remain on the track or road.

当有轨电车或汽车沿着弯曲道路行驶时，必然有某种作用提供一个指向曲率中心的力，以便运动的车辆能继续保持在轨道或马路上行驶。(in order that 引出目的状语从句。)

638. Our civilization is based to such a large extent on machinery and technology in general that it may seem absurdly unnecessary to dwell at all on the practical applications of physics, since every intelligent reader knows about them.

一般说来，我们的文明社会在如此大的程度上以机器和技术为基础，以致看起来荒唐的是，似乎根本没有必要去详细研究物理学的实际应用问题了，因为每一个有知识的读者对此已经了若指掌。(be based on..., “以……为基础”。to a...extent, “在……的程度上”，作状语，说明谓语行为的“程度”。in general, “一般说来”，作插入语。与 such... 相呼应，that 引出结果状语从句。)

639. Transformer can be used to increase the voltage of a. c. generators so that electrical energy can be transmitted economically at high voltage and low currents.

变压器能用来升高交流发电机输出的电压，以使用高电压、低电流来经济地输送电能。
(so that 引导目的状语从句。)

注：so that 既可引出结果状语从句，也可引导目的状语从句，主要应根据句子上下文的逻辑关系来判断。如果从句中有 may, must, can 等情态动词，则往往是目的状语从句，但也不是绝对的。

which 的用法

- (1) which 引导限定性定语从句；
- (2) which 引导非限定性定语从句；
- (3) which 引导特种定语从句；
- (4) 介词 + which 的定语从句；
- (5) 名词（代词，数词） + of + which...；
- (6) which 引导名词性从句；
- (7) which 用于强调句型。

which 用法实例的分析与翻译

640. Over 60% of the land area is mountainous, 21% is covered with production forest lands of which there are some considered the largest in the world.

面积的60%多是山地，21%覆盖着经济林，其中有些被认为是世界上最大的森林。（of which... 中，of表示“其中”，与among意义相同。which指lands。在which引导的定语从句中some是主语，谓语是there are。considered... 为过去分词短语作定语修饰some。）

641. There are many situations in which this ability to handle and to analyse large quantities of arithmetic data according to instructions is of great value.

在很多情况下，这种按照指令处理和分析大量算术数据的能力具有重大意义。（in which的定语从句中，主语是ability，谓语是is。be + of结构有“具有”之意。）

642. There are countries in which unnecessary poverty prevails because the people as a whole are unaware of methods whereby it can be relieved.

在一些国家还存在着不应有的贫穷落后的现象，因为这些国家的人民从整体来说还不知道用什么办法才能摆脱这种贫穷落后现象。（in which... 修饰主语countries。翻译时，把主语与其修饰语作为整体来处理。）

643. Sociologists have tried to reach beyond the weighing and measuring of social problems to an understanding of the social context in which they are generated.

社会学家曾试图超越权衡社会问题之外去理解产生社会问题的来龙去脉。(in which 在句中作地点状语, which 代替 context。)

644. The major advantage of launching a spaceship either from the moon or its satellites consists in that the mass of the moon and therefore its gravity force is much less than that of the earth due to which the spaceship needs considerably lower velocity to depart from them.

从月球上或从其卫星上发射宇宙飞船的主要优点在于:与地球相比月球的质量要小,因此其重力也要小,由于重力小,飞船在离开月球或其他卫星时所需的速度也就低得多。(from the moon...satellites 是动名词 launching 的地点状语, that of the earth 这里的 that 代替 gravity force。 them 代替 moon 和 satellites。 due to which..., due to, “由于”, which 代替 gravity force。)

645. Modern English has been developed and there is now a single accepted pronunciation for the vast majority of words in ordinary politic use, deviation from which is regarded either as a provincialism or as a vulgarism.

现代英语已经发展起来了。现今公共场所使用的大多数字的发音都有一个公认的统一的标准。不符合这个标准,就被认为方言或俗语了。(there is... 句中主语是 pronunciation。 which 引导的定语从句中 deviation 是主语,谓语是 is regarded。 which 是介词 from 的宾语。 which 代替先行词 pronunciation。)

646. Population is bunched mainly in coastal cities, the biggest of which are capitals of the country's states and the federal capital Canberra.

人口主要聚集在沿海的城市,其中最大的是各洲的首府和首都坎培拉。(which 引导的定语从句中,主语是 capitals, are 的表语是 the biggest, of 表示“其中”, which 指 cities。)

647. The extent to which the ruling class can accomplish this depends on the vigour with which the workers pursue the class struggle.

统治阶级用这种办法能做到什么地步,要看阶级斗争中工人阶级力量的强弱。(to a certain extent, “在某种程度上”, extent 前经常用 to 构成程度状语。 to which 在句中作状语修饰谓语 can accomplish。 with which 在句中也是作状语,修饰谓语 pursue。)

648. To conclude, it is clear that the whole world is passing through a social revolution in

which a central part must be taken by scientists and technologists.

总之，显然整个世界正在进行社会变革，在这场变革中科技人员必然要扮演重要的角色。(in which 在定语从句中是谓语 must be taken 的地点状语。)

649. Man has achieved remarkable success in the field of astronautics the ultimate goal and purpose of which is to gain for man himself access to space and to other worlds.

人们在宇航方面已经取得了惊人的成就，宇航的最终目标和意图就是使人类能亲自进入空间并到达其他星球。(access 是 to gain 的宾语，介词短语 for man himself 作状语，修饰 to gain。of which 作 the ultimate goal and purpose 的定语，而 goal 与 purpose 是 which 定语从句中的主语，谓语 is to gain。)

650. It must be remembered that when experiments are carried out to illustrate certain aspects of a process, it is necessary to put up control experiments as far as possible in which the specific factor under consideration is not restricted.

必须记住，为了阐明某一过程的某些方面而进行实验时，应尽可能采用对照实验，因为在这种实验中要考虑的特殊因素并不受到限制。(be restricted in...，“被限制在……范围内”。which 指 experiments。)

651. In the scientific system, the unit of mass is the gram; this was originally defined as the mass of one cubic centimeter of water at 4°C, at which temperature the density of water has its maximum value.

在科学体系中，克是质量的单位；最初，把 1 立方厘米水在摄氏 4 度时的质量定义为 1 克，在这一温度下，水的密度具有最大值。(which 在从句中作定语，修饰 temperature。which temperature 指 4°C，which 引出的是特种定语从句。)

652. There is a great deal of difference in the ability of different substances to conduct or insulate and that decides which material is the best to use for a particular purpose.

不同物质的传导和绝缘的能力有很大差别，这就决定了哪种材料最适用于某一特定的用途。(that 用来代替上面整个句子。连接代词 which 引出的是宾语从句。)

653. Computers can be defined as devices which accept information, perform mathematical or

logical operations with the information, and then supply the results of these operations as new information.

计算机的定义是：接受信息，对信息进行数字或逻辑运算，然后把这些运算的结果作为新的信息而输出。（which 在从句中作主语，引出的从句修饰 devices。）

654. As water gets colder it contracts, which is ordinary behavior, until it reaches the temperature of 4°C above freezing point. After that, as it gets colder, it expands.

水温在降到冰点以上 4°C 前，水遇冷则收缩，这是水的特性之一。在 4°C 以下，当水变得更冷时，水则膨胀。（which 指上句整个内容。）

655. But finally man learned the many uses of fire. This knowledge has enabled him to create the advanced civilization in the midst of which we live today.

但人类终于懂得了火的很多用处。这种知识使人类能够创造出我们今天生活于其中的先进文明社会。（in the midst of which...today 是定语从句，which 代替 civilization。in the midst of which 在从句中是 live 的地点状语。）

656. Many aluminium bronzes have been developed, the strength and hardness of which may be increased considerably by the same heat-treatment as that employed in the treatment of aluminium-copper alloys.

人们已经研制出多种铝青铜合金，采用与铝铜合金同样的热处理方法，就可大大提高铝青铜合金的强度和硬度。（the strength...of which...alloys 是定语从句，which 代替 aluminium bronzes。）

657. It might be thought that confusion would arise from the practice of using the word weight to refer both to the mass of an object and to the force with which the object is attracted by the earth.

可以想像，重量这个词如果既用来表示物体的质量，又用来表示地球对物体的引力，这样的做法会引起混乱。（with which 在句中作方式方法状语，“用这个来……”。）

658. Low carbon steels are used chiefly for bolts, nuts, and various machine parts the surfaces of which are not subjected to hard wear.

低碳钢主要用来制造螺栓、螺母以及表面不受磨损的各种机器零件。(the surface of which...是定语从句, which 代替 machine parts。the surfaces 在定语从句中作主语。)

659. There are many reasons for the tidal action which is a very complicated phenomenon involving many factors all of which must be considered to predict tide in any one place at any one time.

潮汐活动是一种非常复杂的现象, 成因很多, 要想预测任何地方任何时候的潮汐, 就必须考虑所有有关的因素。(all of which 在句中作主语。)

660. But the greatest success of the Greeks was in geometry, for which little or no observation or experiment was required, but simply the exercise of pure reason.

而希腊人的最大成就表现在几何学方面, 因为几何学几乎不需要或根本不需要观察和实验, 只需运用纯推理。(little or no, “几乎不”或“根本不”。but 引出的并列分句中省略了谓语 was required。which 引导定语从句, for which 作谓语的目的状语。)

661. The velocity enters as a squared term so that kinetic energy does not depend on which way the mass is going.

这里的速度是作为平方项出现的, 因此动能与质量运动的方向无关。(which 引导的是宾语从句。which 是连接代词, 修饰 way, “哪个方向”。)

662. In order to describe the motion of a body completely we consider it necessary to state the direction in which it moves and also the speed with which it moves.

为了完整地描述物体的运动, 我们认为有必要指出物体运动的方向, 也要指出物体运动的速度。(with which 在定语从句中是谓语的方式方法状语。in which 用作地点状语。)

663. Yet later, more strictly controlled experiments failed to support this conclusion, which could have been due to a misinterpretation of chance results.

然而, 以后的更为严格控制的实验并未证实这一结论, 因为该结论是由于错误地解释某些偶然的結果而得出的。(which 引导的非限定性定语从句有原因意味。)

664. Microwaves, which have a higher frequency than ordinary radio waves, are used routinely in sending thousands of telephone calls and television programs across long distances.

微波比一般无线电波有更高的频率，因此通常用它传送大量长途电话和远距离电视节目。(which 引导的非限定性定语从句有原因意味。)

665. I believe that the rising complexity of scientific research is now imperatively demanding new steps, which can ensure that international involvement moves to more organized and better-planned structures.

我确信，科学研究难度的日益增大正迫切要求采取新的步骤，以保证国际性交往朝更有组织、更有计划的机制迈进。(which 引导的非限定性定语从句有“目的”意味。)

666. In order to express the magnitude of a force, some standard force must be selected as a unit in terms of which other forces may be expressed.

为了表示力的大小，必须选择某个标准力作为单位，根据这个单位来表示其他的力。(in term of which 在定语从句中作状语，which 代替 a unit。)

667. According to Einstein's formula, however, when a substance is converted into energy, the atoms vanish. They become changed into light, heat, and other electromagnetic waves, all of which are forms of energy.

可是根据爱因斯坦的公式，当物质转化为能量时，原子就消失了。它们变成了光、热和其他电磁波，所有这些都是能量的表现形式。(all of which 在句中作主语。)

668. Your school, for example, is at rest only in relation to the ground on which it stands, but the Earth's surface is not at rest since the Earth is revolving around its own axis and is also moving around the sun.

例如，你们的学校仅仅相对于它所在的地面才是静止的，但地球表面并不是静止的，因为地球在不停地绕着地轴自转并绕着太阳旋转。(in relation to..., “就……而论”，“关于”，“相对于……”。)

669. The ease with which liquids can flow and gases can diffuse points more to a collection of

tiny particles than to a sponge like structure.

液体易流动，气体易扩散，这就表明它们很可能是些微小粒子的聚合体，而不是海绵状结构。(with which 在从句中作状语。)

670. The greater the temperature difference between the source of the heat flux and the surrounding medium, the greater the success with which the useful utilization of thermal energy can proceed.

热源与周围媒介之间的温差越大，有效利用热能的成效就会越大。(with which 在从句中作状语。)

671. In fact, the distance of the earth from the sun varies so little that it makes hardly any difference, and the seasons – four seasons spring, summer, autumn and winter – depend on the manner in which the earth rotates on its axis.

事实上，地球离太阳的距离几乎没有什么变化，因而不会产生什么差异，一年四季即春夏秋冬取决于地球的自转方式。(little 用作副词，说明 varies。in which 在从句中作方式方法状语。)

672. As in the case of electrostatics, two basic laws govern the behavior of magnetic bodies, the first of which is to the effect that like poles repel and unlike attract.

就静电学而言，磁体的性能受两个基本定律的支配，定律之一的大意是：同极相斥，异极相吸。(the first of which... 是定语从句，which 代替 laws。to the effect that..., “大意是说”。)

673. Today, silicon rectifiers, the advantages of which lie in their small size, light weight, long lifetime and high efficiency, are being extensively applied in industry.

由于硅整流器具有体积小、重量轻、寿命长、效率高等优点，所以在工业中正得到广泛的应用。(the advantages of which... efficiency 是非限定性定语从句，补充说明 silicon rectifiers。)

674. It is also found that the velocity of sound depends on the temperature of the air, so that the temperature at which the determination is made should be recorded in order that the results may be compared with those of other observers.

人们还发现，声速与空气的温度有关，因此，应把测定声速时的温度记录下来，以便将测

得的结果与另一些观察者测得的结果加以比较。(第一个 that 引导主语从句。so that 引出结果状语从句。in order that 引出目的状语从句。at which...is made 是定语从句, 修饰 temperature, those 代替 results。)

675. The temperature scale used in all scientific work is the centigrade scale, on which the temperature of melting ice is called 0°C , and the temperature of water boiling at standard pressure is called 100°C .

在各项科技工作中使用的温度是摄氏温标, 根据这种温标, 冰点的温度为 0°C ; 在标准大气压力下水的沸点温度为 100°C 。(on which 是方式方法状语。)

676. The input and output units are often slower in operation than the rest of the computer, which makes it necessary to store unworked and partly processed data in the storage unit.

输入和输出单元在运行时往往比计算机其他部分慢, 这就使得有必要在存储单元储存未加工的和部分处理过的数据。(which 指上句整个内容。)

677. Depending upon which terminal of any pair is taken as a reference, therefore, the induced voltages between terminals of any pair of coils are either in phase or 180 degrees out of phase.

因此, 任意一对线圈两线端之间的感应电压或者是同相位, 或者是 180 度反相位, 这要看把这对线圈的哪一端作为基准而定。(Depending upon...reference 是分词短语, 作条件状语。其中 which 引导的是宾语从句; which 在从句中是定语, 修饰 terminal, 意为“哪一端”。)

678. With a small rocket, the fuel only burns for something like half a minute, after which the speed of the rocket gets less and less, until it finally falls back to earth.

对于小型火箭来说, 燃料只燃烧大约半分钟, 此后, 火箭的速度越来越慢, 直到最后返回地面时为止。(which 引导的是特种定语从句, which 指上句内容。)

679. Sometimes the pressure differences are produced mechanically by a pump, or blower, in which case the heat transfer is said to occur by forced convection.

有时可用机械方法由泵或压缩机来产生压力差, 在这种情况下, 可以说是通过强迫对流来进行热传递的。(in which case, “在这种情况下”, which 指的是整个主句的内容, which 引导的是特种从句。)

680. Since the International Standard Meter is the length in terms of which the metric units of length are defined, it is called a primary standard of length.

因为国际标准米是据以确定公制长度单位的长度，所以称它为长度基准。(in terms of which 在定语从句中作方式方法状语，which 代替 the length。)

681. In theory, photons would race through such a machine with near perfect efficiency, which would make an optical computer 1 000 times as fast as the most advanced of modern electronic supercomputers.

在理论上，光子会以接近理想的效率通过这种机器，这使光子计算机的运算速度是最先进的现代超级电子计算机的 1 000 倍。(which 代表上句整个内容。which 引导的句子为特种定语从句。)

682. Were heat energy potential, a body, on being heated or cooled, would have to change in shape, or its molecules would have to be moved to a higher or lower potential, which is difficult to imagine.

如果热能是势能，那么物体在受热或冷却时其形状势必会发生变化，物体的分子或朝较高势能处移动、或向较低势能处移动，而这是难以想像的。(Were heat energy potential 等于 If heat energy were potential, 这是省略 if 的虚拟条件从句。being heated 和 being cooled 均为动名词被动态，作介词 on 的宾语。which 是指整个主句内容，引导特种定语从句。)

as 的用法

在英语中 as 具有多种用途，主要可归纳为四大类 (1) 作介词；(2) 作连词；(3) 作关系代词；(4) as 构成的成语词组。这里只介绍 (2)、(3) 类用法。as 的用法较复杂，是阅读中难点之一。

as 用作从属连词的用法

- (1) as 引导时间状语从句；
- (2) as 引导原因状语从句；
- (3) as 引导方式方法状语从句；
 - 1) as;
 - 2) as...so... (just as..., so...);
 - 3) just as;
 - 4) as if, as though;
- (4) as 引导让步状语从句；
- (5) as long as 引导条件状语从句；
- (6) as 用作关系代词引导定语从句；
 - 1) as;
 - 2) such..., as... (such as...);
 - 3) as many...as; as much...as;
 - 4) the same...as ...;
- (7) as + 过去分词 (形容词), 在句子中作定语或状语。

as 用作连词实例的分析与翻译

683. Small as it sounds, this one - fiftieth (plastics waste) represents well over four million tons a year of rubbish which is seldom profitable to recycle.

尽管 1/50 (废塑料) 这个数字听起来不算太大，但它却相当于每年有大大超过 400 万吨的垃圾，而回收这些垃圾几乎是无利可图。(as 引导让步状语从句，it 是主语系动词 sounds, Small 是表语。)

684. Here it is important to realize that science is a unity and that, important and exciting as the science done with spacecraft is, it is not a separate discipline but just another window through which we may look out on our world.

这里，要认识到科学是一个整体是极为重要的，尽管与宇宙飞船有关的学科很重要，而且令人振奋，但它并不是一门孤立的学科，我们就是通过它来观察世界的另一窗口。（it 为形式主语代替 to realize... 两个 that 均引导宾语从句。important...as the science...is 是 as 引导的让步状语从句。done with spacecraft 是过去分词短语，作 science 的定语。do with, “和……相处”，“和……有关系”。）

685. Impressive and complex as it may appear, the rocket, which was invented in China over 800 years ago, is a relatively simple device.

800 多年前中国便发明了火箭。现在的火箭，虽然看起来复杂而令人叹服，但仍是 个比较简单的装置。（as 引导让步状语从句，Impressive and complex 是系动词 appear 的表语。）

686. These solid-state devices, small as they may be to the eye when hundreds of circuits can be packed on to one square inch, are still much larger than they need be to do the jobs they have to do.

这些固体器件，几百个电路排在一平方英寸面积上，用肉眼看来尽管是够小的了，但和它们必须完成的工作所需的尺寸相比，仍嫌太大。（as 引导让步状语从句，small 是系动词 be 的表语。）

687. Strange as it may seem, plastic are the chief villains even though they make up only one-fiftieth of the total amount of solid waste in an industrialized country.

说起来也许很奇怪，废弃的塑料虽然只占一个工业化国家的固体废料总量的 1/50，但却最难处理。（as 引导让步状语从句，Strange 是系动词 seem 的表语。it 用来代替整个主句的内容。）

688. It is well known that copper and aluminium are widely used in electrical wires to transmit electricity as they allow electrons to flow freely through their structure.

众所周知，铜和铝广泛地用作电线以输送电能，因为铜和铝容许电子自由地通过其结构。

(as 引导原因状语从句。)

689. It is believed by many leading educational authorities that the influence and impact of computers in education are rapidly revolutionizing the entire process of learning and might easily topple the concept of a centralized college or university as we know it today.

教育界很多主要的权威人士认为，计算机对教育的影响和冲击正迅速促使整个学习过程的变革，因而有可能动摇我们目前所理解的集中的学院或大学的概念。(as 引导方式方法状语从句，as 在句中不是成分。)

690. As bodies rolling over one another are less subject to friction than bodies sliding over one another, ball bearings and roller bearings are often used instead of plain bearings.

因为相互滚动的物体比相互滑动的物体受到的摩擦力小，所以通常采用滚珠轴承和滚柱轴承而不采用滑动轴承。(as 引导原因状语从句。)

691. Gravity tries to cause all bodies to move downward, and to accelerate such bodies as are already moving downward.

重力力图使一切物体朝下运动，并使已经朝下运动的物体加速。(such 修饰 body, as 在从句中作主语，与 such 相呼应 as 引导定语从句。)

692. The battery does not manufacture electrons. As many electrons flow into the battery each second as flow out.

电池不能制造电子。每秒钟输入电池的电子数与输出的电子数相等。(第二个 as 引导定语从句，as 代替 electrons, 在从句中作主语。)

693. Unlike the scientists, the engineer is not free to select the problem which interests him; he must solve the problems as they arise, and his solutions must satisfy conflicting requirements.

工程师与科学家不同，他们不能随意挑选他们喜爱的课题；而是每当问题出现时他必须加以解决。并且，他们的解决办法必须满足许多互相矛盾的要求。(as 引导时间状语从句。)

694. Within the next 15 years the United States will need twice as many power generating plants as it has now plus the necessary distribution system to take care of the increase.

在今后 15 年内，美国的发电厂需要增加一倍，此外，还要加上必要的配电系统以满足这一增长的需要。(as many...as 引导定语从句，as 代替 plants，在句中作 has 的宾语。它是关系代词。)

695. It has even been suggested that we might attribute to space such properties as would enable one to account for the transmission of radiation.

甚至已经有人提出了这样的假定：我们可以把能使人们说明辐射传输的那些特性看成是由空间而引起的。(与 such 相呼应，as 引导定语从句，as 在句中作主语。)

696. However, the land itself is gradually becoming worn out as it is being used, in some cases, too heavily, and artificial fertilizers cannot restore the balance.

但是，土地本身的肥力在逐渐地耗尽，因为在一些地区土地被使用得太厉害，而人造的化学肥料不可能恢复这种平衡。(as 引导原因状语从句。)

697. The primary aim of the present book is to supply for students beginning the study of theoretical Mechanics a course of such a nature as shall emphasize the fundamental physical principles of the subject.

该书的主要目的就是为初学理论力学的学生提供一本教程，其特征是强调该课程的基本原理。(as 引导的定语从句用来修饰 nature，as 在句中作主语，代替 nature。)

698. The useful life of a structure or a machine part depends quite as much on its surface properties as on its bulk properties.

结构物或机器零件的有效寿命不仅取决于它们的表面性能，同样也取决于它们的整体特性。(as much...as..., “在与……同样程度上”，作状语。在本句中 as 不是引导定语从句。)

699. The human problems associated with living in the ocean are the same as the problems of living in outer space: pressure, lack of oxygen, and weightlessness.

人类在海洋中生活所遇到的问题与在外层空间生活遇到的问题是相同的，即压力、缺氧与失重。(as 引导的定语从句中省去了 are，as 在句中是 are 的表语。)

700. If we wanted the same amount of illumination on the book two feet from the light, as there was on the book one foot away, we would need a light that is four times as bright as the original light.

如果我们要求一本离灯 2 英尺远的书得到与离灯 1 英尺远时相同的照度，那么我们将需要一个亮度是原来的灯亮度 4 倍的灯。(as 是关系代词，代替 amount of illumination, as 是 there was 结构中的主语。)

701. Substances which are made up of only one kind of atom are called elements and there are about a hundred of these – the same number as there are kinds of atom.

只由一种原子构成的物质称为元素。大约有 100 种元素——和原子种类的数目大致相等。(第一个 there be 句中的主语是 a hundred..., 第二个 there be 句中的主语是 kinds of atom. as 引导定语从句。)

702. We can think about the electricity flowing through a wire in the same way as we think about water flowing through a pipe.

我们可以认为，电流通过导线与水通过管道的方式是相同的。(think about, “考虑”，“回顾”。as 在所引导的定语从句中作关系副词，起状语作用，代替主句中的 in the same way。)

703. In other words, telephone researchers are thinking of using light for the same purpose as radio waves are now used – to transmit telephone calls, television programs, and data messages from one point to another.

换言之，电话研究人员想用光来达到目前使用无线电波的目的，即把电话、电视节目和数据信息从一个地方输送到另一个地方。(as 是关系副词，代替目的状语 for the same purpose。)

704. In other words, whether microorganisms do or do not require preformed vitamins for growth, they utilize these substances for their biochemical activities in much the same way as do plants, animals, and men.

换言之，不论微生物生长时是否需要现在的维生素，微生物与动物、植物和人都以同样的方式利用这些维生素进行自己的生化活动。(as 是关系副词，代替 in much the same way。)

705. The same amount of heat is given out by a body in cooling from a high to a low temperature as is required to raise the body from that same low temperature to the same high temperature.

某一物体由高温冷却到低温所释放出来的热量，等于把该物体由同一低温升到同一高温所需要的热量。(The same...as..., “与……一样”，“和……相同”，本句译为“等于”。关系代词 as 引导定语从句，as 在从句中作主语，代替 amount of heat。)

706. When ice melts it is found that it contracts slightly in volume, as has already been emphasized in the preceding chapter.

当冰融化时，人们发现其体积略有收缩，前一章已经强调了这一现象。(as 在定语从句中作主语，代替整个主句。)

707. There is therefore, in a given body, no constant quantity of energy, as there is of mass.

因此，在给定的物体中，能量不像质量那样是恒定的。(as 引出方式方法状语从句，as there is 后省略了 constant quantity。)

708. When we do succeed in exploding the nucleus, as was accomplished in the atomic bomb, an enormous amount of energy is released.

当我们成功地引爆原子核时——这在原子弹里实现了——巨大的能量就被释放出来。(as 指 when 引起的句子。as 引导定语从句，在句中作主语。)

709. A careful observer will notice that a wire becomes thinner when it is stretched as may be seen by pulling on a piece of rubber hose.

一个细心的观察者会注意到，当金属丝被拉长时，它会变得较细，拉伸一根橡皮管时，也可看到这种类似的变化。(as 指 that 引起的宾语从句和 when 引导的时间从句。as 引导定语从句，as 在句中作主语。)

710. In consequence the weight of an object as measured by a spring balance is greater at the north or south pole than at the equator.

因此，若用弹簧秤来称某一物体的重量，则物体在南北两极比在赤道上要重一点。(as measured... 作定语，修饰 object，但有条件的意味。)

711. In this position (lie down in the ship) it is easier for spaceman's heart to pump the blood to all the parts of his body as compared with a standing or sitting position.

与站着或坐着的姿态相比，宇航员处于这种姿态时（在飞船中躺着），更有利于他的心脏向身体的各部输送血液。（as compared with 有条件状语的意味。）

712. There are 107 elements, including all matter as found in nature, and the difference between one element and another is in the structure of its atoms.

包括自然界中所发现的一切物质在内，元素有 107 种。元素之间的区别就在于其原子的结构。（as found in nature 有定语从句的意味，用来修饰 elements。as 作主语，其后省略了 were。）

713. The term mass, as used in mechanics, refers to that property of matter which in everyday language is described by the word inertia.

力学中使用的质量这一术语，指的是物质的一种属性，这种属性在日常语言中是用惯性这个词来描述的。（as used... 作定语，修饰 term。as 在从句中作主语，代替 term，as 后省略了 is。）

714. As explained earlier, winds and the unequal heating of the earth by the sun are also responsible for waves and oceanic currents.

如前所述，风以及太阳对地球的不均匀加热，也会引起波浪和洋流。（As 代替整个句子，有插入句的意味。）

715. The test, as currently understood, is simply this: if a computer can perform in such a way that an expert cannot distinguish its performance from that of a human who has a certain cognitive ability – say, the ability to do addition or to understand Chinese – then the computer also has that ability.

正如我们目前所知道的，这项测试并不复杂：假如能使计算机做到一个专家做不到的事，专家区分不开计算机与人的行为之间的差别，这人是指具有认知能力的人，如，会加减或懂中文，计算机则有这种能力。（as 代替主句。）

716. Over the last forty years scientists have been studying the upper atmosphere, as distinct from the lower atmosphere, and all kinds of phenomena have been discovered there which vary with

the sunspot cycle.

最近 40 年里科学家一直在研究上层大气（它有别于下层大气），因而发现了随太阳黑子周期变化而变化的各种现象。（have been studying 是现在完成进行的，表示科学家们在这 40 年中一直到目前在继续不断地研究上层大气，强调行为从过去到现在的连续性。as + 形容词的结构与 as + 过去分词作用基本相同，起定语作用，as distinct...，用来修饰 atmosphere。）

717. The memory section of the computers is somewhat similar to the human brain which also stores information that can be retrieved as needed.

计算机的存储器有些像人的大脑，存放着可按需要从中提取的信息。（as needed 用作状语，修饰 can be retrieved。）

718. A meter is supposed to be 1/10 000 000 of the distance between the equator and the North Pole, as measured on a meridian through Paris.

1 米定为赤道和北极之间距离为千万分之一，该距离是沿着通过巴黎的子午线测量的。（as measured... 相当于非限定性定语从句，从句 as 作主语，as 后省略了 is。）

719. We see no signs of life on the moon, for life as we know it cannot live where there is practically no atmosphere and where there are such great changes of temperature.

在月球上我们看不见任何生命的迹象，因为正如我们所知，生命是不可能在没有空气而温度变化很大的地方存在的。（as we know it 用作插入句，for 是连词“因为”，life 是主语，谓语是 cannot live。）

720. As was mentioned in the part 1, the proliferation of nuclear power electric generating plants will continue until more than half of the world's energy requirements will be supplied from this source.

在第一部分中已提到，核发电厂的数量将继续增加，直到全世界所需的能量有一半以上由这种能源提供。（As 作主语，代替整个句子。）

721. Pure and applied science are two totally different activities, having little or no interconnection, as is often implied.

理论科学和应用科学并不像人们经常理解的那样：似乎它们之间几乎没有或根本没有联

系，是两个完全不同的活动领域。(as 在句中作主语，代替上面整个句子。)

722. Air is sometimes visible, as may be observed when it is heated in contact with the ground on a hot summer day.

空气有时是看得见的，在炎热的夏天，当空气接触地面而受热时，就可观察到这种现象。(as 指整个主句，在句中作主语。)

723. The effects of electric currents are quite different from those of static electricity, just as the phenomena of water in motion differ from those of water at rest.

正如流动水的现象与静止水的现象不同一样，电流的作用与静电的作用也是完全不同的。(just as 引导比较状语从句。)

724. Just as enough oxygen in the air is needed to make burning possible, enough carbon dioxide in the air will make burning impossible.

正像空气中需要有足够的氧才能够燃烧一样，空气中若二氧化碳过多，就不能燃烧。(Just as 引导状语从句。)

725. It was not long until transistors were being manufactured in great quantities and in as many different configurations as were vacuum tubes.

不久，人们就生产出大批晶体管，而且，型号同真空管一样多。(as 引导定语从句，as 代替 in as...configurations, as 在从句中是关系副词。)

726. For a long time men thought that atoms were indivisible. You can break molecules down into atoms. But that, they said, is as far as you can go.

长期以来，人们认为原子是不可分的。他们说，分子可以分裂为原子，但只能到此为止。(as far as...go, “就……而论”，“到……为止”。as 在从句中起到程度状语作用。)

727. The characteristic of a mixture is that each of the substances present, though mixed with the others, has exactly the same properties as if it were present alone.

混合物的特点是：每一种物质虽然与另一些物质混合在一起，但仍然完全保持着原来同样的特性，好像它单独存在时一样。(present 是形容词，作后置定语，修饰 substances。though

后省略了 it is。as if 引导的从句中常用虚拟语气。)

728. The next decade will see almost a reinvention of television – not through improved programs, as many might wish, but through the melding of TV, the computer and the telephone into something almost entirely new.

今后的十年中将出现一种完全新型的电视——并不像许多人希望的那样通过改进电视节目，而是通过把电视、电脑和电话融为一体，而成为一种几乎全新的东西。(as 作 wish 的宾语)

what 的用法

what 作关系代词时可引导名词性从句，即主语从句、宾语从句和表语从句。what 在从句中可作主语、宾语、表语和定语。what 用作关系代词时，它相当于 the thing(s) which，这时要把 thing 译得正确，译得贴切，并非易事。译好 the thing 主要有两点：一是深入理解原文；二是要掌握汉语用词规律。例：

(1) An hypothesis is a guess at what causes a certain behavior.

假说是对引起某种行为或状态的原因的一种猜想。(what... 引导宾语从句，what 在句中作主语。)

(2) This modulation is what the radio receiver utilizes to reproduce the radio program from the broadcasting station.

这种调节就是收音机用以再现广播电台播送的无线电节目的一种手段。(what 是系动词 is 的表语从句，what 在从句中作 utilizes 的宾语。)

(3) Energy is what makes things work, and it can be changed into heat or light or used to drive machinery.

能量是使物体做功的能力，它能转变成热或光，或者用来开动机器。(what 引导表语从句，在句中作主语。)

(4) When matter is changed to a substance different from what it was, the change is a chemical change.

当一种物质变为不同于原来的物质，这种变化称为化学变化。(what 引导宾语从句，what 在从句中是 was 的表语。)

(5) The central force and the opposing reaction constitute two aspects of what we shall later have occasion to deal with.

向心力和反作用力构成了我们以后将有机会研究的问题的两个方面。(what 引导宾语从句，它在从句中是 deal with 的宾语。)

(6) Because magnetism cannot be detected by our senses, the only way we can learn anything about it is by noting what it does.

因为我们的感官探测不到磁力，我们认识磁力的唯一途径，就是注意磁力的作用。(what

引导表语从句，what 在句中是 does 的宾语。)

(7) We know now that atomic energy is coming out of the sun all the time. This is what warms and heats our world.

现在我们知道，原子能不停地从太阳中发射出来，这就是给我们这个世界以温暖和热量的**源泉**。(what 是表语从句，what 在句中作主语。)

(8) A helicopter can take off or land almost anywhere without any special preparation. This is what makes the helicopter such a useful vehicle.

直升飞机几乎可以在未经专门准备的任何地方起飞和降落。这就是使直升飞机成为一种如此有用的交通工具的**原因**。(what 引导表语从句，what 在从句中作主语。)

(9) One answer to the problem of air pollution is to build a car that does not pollute. That is what several major automobile manufacturers are trying to do.

解决空气污染问题的办法之一就是制造不产生污染的汽车。一些大型汽车制造厂正在做这样的**尝试**。(what 引导表语从句，what 在从句作 to do 的宾语。)

(10) By advertising companies make the public interested in what they want to sell.

通过广告，各公司使公众对他们想要销售的产品感兴趣。(what 引导宾语从句，what 在从句中作 to sell 的宾语。)

(11) On the surface of the Moon, the gravitational force on a body is only 1/6 of what it is here on Earth.

物体在月球表面上的重力只有在地球上重力的 1/6。(what 引出宾语从句，它在从句中作表语。it 代替 force。)

(12) Being isolated in what is conventionally called empty space, the stars can influence each other freely.

由于各个星体在通常所谓的空间里是彼此隔离的，所以星体能够自由地互相作用。(what 引出宾语从句，它在从句中是主语。being isolated 是现在分词被动态，它所引导的分词短语在句中起原因状语作用。)

what 实例的分析与翻译

729. Unlike animals, plants can take what they need straight from the air and earth and water in which they live.

植物不同于动物，植物能够从它们所生活的环境——空气、土壤和水——中直接吸收它们所需的**养分**。(what 引导宾语从句，what 在从句中作 need 的宾语。)

730. It will not be long now before man takes a giant step away from this planet and visits the moon, learning what it is like to have no weight to his body, no upward direction and no downward.

人类迈着巨人的步伐离开地球去访问月球，领略一下身体失重、辨别不了上下的**滋味**的日子已为期不远了。(what 引导宾语从句，what 在从句中作 like 的宾语。)

731. Lister found what he wanted in a powerful disinfectant, a by-product of coal-tar, which he learned that the authorities at Carlisle were using on their sewage. It was called carbolic.

利斯特在一种高效的消毒剂即煤焦油的副产品中，发现了他所需要的那种**物质**，他得知，卡里斯尔当局正用这种消毒剂来处理污水，这种物质叫做石炭酸。(what 引导宾语从句，what 在从句中作 wanted 的宾语。)

732. What we are trying to provide outside the universities is an increasingly wide range of higher and further education opportunities and choices available to school-leavers.

我们现在应力求在大学之外给中学辍学者提供更多的升学和选修的机会。(what 引导主语从句，谓语是 is...range。available to... 为形容词短语，作定语修饰 opportunities and choices。)

733. An attempt was made to give some coherence to agrarian policy in the two "green plans" of 1961 and 1966 which proved to be effective, though the funds made available were still below what was required. Since then there has been a complete blank.

在 1961 年和 1966 年两次“绿色计划”中企图实施一贯的农业政策，这种政策证明是有效的，可是所拨款项仍然低于要求。此后什么农业政策也用不上了。(不定式短语 to give...1966，作定语修饰 attempt。though 这里不作“虽然”解，though 用于主句后，用作并列连词，作“可是”，“不过”解。made available 当过去分词短语作定语修饰 funds。what 是 below 要求的宾语从句，它在句中作主语。)

734. Air transport is just at the beginning of its evolution; to set limits to what it may become would be folly.

空运正处在发展的开始阶段，对其发展的**前景**加以限制是很不明智的。(what 引导宾语从句，what 在从句中作 become 的表语。不定式短语 to set...become 作主语，谓语是 would be

folly.)

735. There exist what are known as self-luminous bodies i.e., bodies the atoms of which are in some way “excited”.

存在着一种所谓自发发光体，即其原子在某种程度上是受激的那些物体。（在 There 引导的句中，主语是 what 引导的主语从句，what 在从句中作主语。）

736. Very large numbers often pop up in what may seem at first sight a very simple problem, in which you would never expect to find any number larger than a few thousands.

在那些初看起来似乎非常简单，你从没有料到可能会从中发现多于几千的大数的问题中，却常常会有极大的数冒出来。（what 引导宾语从句，what 在从句中作主语。）

737. What Dalton said was that, although many thousands of different chemical substances are known, these are made up of only a few different kinds of atoms combined together in definite simple ways.

道尔顿所说的是，虽然人们知道成千上万种不同的化学物质，但这些物质只是由种类不多的以一定的简单方式化合在一起的原子组成的。（what 引出主语从句，它在从句中是 said 的宾语。）

738. So the amount of heat a material can take in when it is heated and gives off when it is cooled depends on what the material is as well as on its weight.

因此，材料受热时吸热，而冷却时则放热，这热量取决于材料的性质和重量。（a material...is cooled 是省略关系代词 that 的定语从句，修饰 amount of heat，这个定语又包含两个由 when 引导的时间状语从句，分别说明两个谓语 can take in 和 gives off。what 引导的是 on 的宾语从句，what 在句中作系动词 is 的表语。）

739. There are times when computers seem to operate like mechanical “brains”, but their achievements are not very spectacular when compared to what the minds of men can do.

有的时候，计算机运转起来似乎很像机械“大脑”，但与人的智力所能做到的相比，却稍逊一筹。（when 引出定语从句，用来修饰 times。what 引导宾语从句，what 在从句中作 can do 的宾语。）

740. Like all other forms of energy, the electric energy so generated can be measured in terms of what it can do.

像其他形式的能量一样，这样产生的电能可根据它所做的功来测量。(what 引导的从句作短语介词 in terms of 的宾语，what 在从句中是 do 的宾语。)

741. We have learned that air is a mixture of gases, of which oxygen, water vapor, and carbon dioxide are the most important for what they do.

我们已经懂得空气是一些气体的混合物，其中氧、水蒸气、二氧化碳由于它们所起的作用而成为最重要的成分。(what 引导的从句作介词 for 的宾语，在从句中 what 是 do 的宾语。)

742. At the beginning it is important that we arrive at a clear understanding of what is meant by the term "charge".

一开始我们就要清楚地了解“电荷”的含义，这一点是很重要的。(what 引出宾语从句，在从句中是主语。what is meant by..., “所谓……的意思是什么”。)

743. In everyday life we often meet the terms force and work. But in science, these terms have meanings different from what we have learned.

在日常生活中我们常常遇到力和工作这两个词。但在科学上，这些词的含义同我们在生活中所理解的含义不一样。(形容词短语 different...learned 作定语，修饰 meanings。what 引导的是宾语从句，what 在从句中作宾语。)

744. But even though the majority of Americans would find it hard to imagine what life could be like without a car, some have begun to realize that the automobile is a mixed blessing.

即使大多数美国人会发现要是没有汽车生活将不堪设想，但有些人已经开始认识到，汽车有利也有弊。(what 引导宾语从句，在从句中 what 作定语修饰 life。)

745. What we call the weight of a body is really the attractive force which the earth exerts on the body, tending to cause the body to approach the earth's centre.

我们称之为物体的重量的东西，实际上就是地球施加于物体并使物体接近地球中心的吸引力。(what 引导的是主语从句，what 在从句中是 call 的宾语。)

746. A moving body possesses what is called kinetic energy, which is measured by half the product of the mass of the body and the square of its velocity.

运动的物体具有所谓的动能，这个动能等于该物体质量与其速度平方之乘积的一半。（what 引导宾语从句，在从句中作主语。which 引出非限定性定语从句，修饰 kinetic energy。）

747. We say, “The air in the cinema is ‘bad’; the hill air is ‘good’”. But goodness or badness is not a property of the air, but of what is mixed with it – dust, soot, water vapour, etc.

我们说：“电影院里空气‘坏’，山区的空气‘好’”。但是好与坏并不是空气的特性，而是与空气相混合的物质——尘埃、烟雾和水蒸气等等的特性。（what 引出宾语从句，它在从句中是主语，it 代替 the air。）

748. Einstein’s brilliant theory said that when energy is stored in matter, it takes the form of a little additional mass, and when the energy is released, the mass goes back to what it was.

爱因斯坦这一光辉理论认为，当能量储存在物质里时，物质的质量便略有增加，而当能量被释放时，质量便又恢复到原状。（what 引导宾语从句，what 在从句中作 was 的表语。）

749. It was not until we have introduced Newton’s first and second laws that we are able to give a precise definition of what we mean in physics by a force.

直到引入牛顿第一、第二定律之后，我们才能给物理学中的力的含义下一个精确的定义。（It was...that... 是强调句型，强调 not until 引出的时间状语从句。what 引导的是宾语从句，它在从句中是 mean 的宾语。）

750. No great scientist ever wants his pupils to be mere gramophone records, faithfully reproducing his remarks, never questioning anything, never wanting to add or subtract from what he has given them.

从来没有一个伟大的科学家希望他的学生是一些只会忠实地重复他的论点，从不提出任何问题，永远不想对老师传授给他们的知识有所取舍的留声机唱片。（reproducing..., never questioning... 和 wanting... 三个分词短语都是非限定性的定语，修饰 records。what 引出宾语从句，它在从句中是 has given 的宾语。）

751. What Einstein's equation means is that if all the energy in one gramme of an element could be released, it would present the power needed to lift a weight of thirty thousand million tons to a height of one foot from the ground.

爱因斯坦公式的含义是：如果任何 1 克元素的全部能量都释放出来，就能够把重达 300 亿吨的物体提升到离地面 1 英尺的高度。（what 引导的是主语从句，在从句中是 means 宾语。）

752. Not only are the movements of the earth of great importance to you, but what the earth is made of, that is, its composition, also governs what you do and provides everything which you have.

不仅地球的运动对你具有重要意义，而且地球是由什么构成的，即它的成分也支配着你的行为，你所具有的一切也是由它提供的。（not only 放在句首，要用倒装结构，主语是 the movements，谓语是 are of great importance。第一个 what 引出的是主语从句，what 在从句中是 is made of 的宾语。第二个 what 引出的是宾语从句，在从句中是 do 的宾语。）

753. If the percentage of oxygen decreases and carbon dioxide increases, no one seems to know for certain what effect this might have on the biosphere.

如果氧所占的比例减少，而二氧化碳所占比例增加，看来，没有人确切知道这会对生物圈产生什么影响。（what 引导的是 to know 要求的宾语从句，what 在从句中作定语修饰 effect。）

whether 的用法

whether 可引导名词性从句，即主语从句、宾语从句、表语从句；还可引导让步状语从句。例：

(1) It makes no difference whether the object is visible or invisible.

不管这个物体看得见还是看不见都没有关系。(whether 引出主语从句。)

(2) The next problem was whether the pull of the earth on its people was the same as its pull on the moon.

第二个问题就是，地球对地球上人们的引力与对月球的引力是否相同。(whether 引导表语从句。)

(3) We ascertain whether a chemical change has taken place or not by observing the physical properties of the materials before and after the experiment.

在实验前后观察材料的物理性质，我们就可确定是否发生了化学变化。(whether 引出宾语从句。)

(4) The chemical composition of water is H_2O whether it is a solid, liquid, or water vapor.

水不论是固态、液态还是水蒸气，它的化学成分都是 H_2O 。(whether 引导让步状语从句。)

whether 用法实例的分析与翻译

754. If you have to learn a skill or commit something to memory, the question arises as to whether you should complete the job in one sitting, or whether it is better to spread the learning over a number of periods.

如果你要学会某种技能或要记住某件事，那么就会产生这样问题：是一口气完成这项工作，还是把学习过程分散成许多阶段，哪种做法比较好呢？(as to, “关于”。两个 whether 均引导 as to 要求的宾语从句。in one sitting, “一口气”。it 为形式主语代替主语 to spread...)

755. At the beginning of the fifteenth century there were great debates as to whether planets really went around the sun or not.

在15世纪初叶，关于行星是否真的绕着太阳运行的问题，曾引起过很大的争论。
(whether 引导宾语从句。)

756. Efficient functioning depends on good design, careful attention to operating difficulties, and lubrication of rough spots, whether they be mechanical or personal.

高效率的运转取决于良好的设计、取决于细心注意操作中的难点以及粗糙部位的润滑——不论它们是机械方面的，还是操作方面的。(whether 引导让步状语从句，句中谓语 be 是虚拟语气的一种，表示现在或将来可能发生的一种设想。Mass is the amount of material in an object, whether it be our bodies or blocks of wood. 质量是物体中物质的总量，不论该物体是我们的身体，还是木块。)

757. It is extremely doubtful whether at the beginning a really economic engine could be made, that is, one cheap enough to make it worth putting in a car.

令人十分怀疑能否在一开始就能制造出真正经济的发动机，即值得安装在汽车里的廉价发动机。(whether 引导主语从句。)

758. But whether scientists' efforts can be more effective than those of the traditional politician may depend not so much on the present-day working scientists, but on the scientists now being trained, i. e. – you.

但是科学家的努力是否会比那些传统的政治家更为有效，这可能不仅取决于现在还在工作的科学家，而且要取决于现在正在接受培训的科学家——那就是你们。(whether 引导主语从句，may depend 为谓语，those 代替 efforts。now being trained 现在分词被动态作定语修饰 scientists，“正在培训的科学家”指正在学习的研究生。)

759. The limits of a person's intelligence are fixed at birth, but whether or not he reaches those limits will depend on his environment.

一个人的智力极限一生下来就是固定了的，但是他是否会达到这种极限取决于他的环境。(whether 引导主语从句。)

760. When two objects, such as a piece of iron and a piece of cork, are dropped from the hands, they fall so quickly that it is very difficult to decide whether one reaches the ground before

the other.

当两个物体（比如一块铁和一块软木）同时从手中掉下来时，它们落下的速度很快，因而很难判断究竟哪一个先落到地面上。（whether 引导宾语从句。）

761. Engineers use X-rays to find out how metals are made up, to check whether they will be strong enough for their purpose and whether there are any flaws in them.

工程师用 X 射线来探测金属的成分，检验这些金属材料的强度是否足以适合于它们的用途，以及在金属内部是否存在缺陷。（句中两个 whether 均引出 to check 的宾语从句。）

762. If one were given a sample of hot air, it would be impossible to tell by any tests whether it had been heated by compression or by heat flow from a hotter body.

如果给我们一个热空气的样品，那么通过任何检测方法都不可能辨别它是通过压缩变热的还是由较热物体的热流加热的。（whether 引导的从句作 to tell 的宾语从句。不定式短语 to tell... 是真正主语，it 是形式主语。）

where 的用法

where 用作连词时，可引导名词性从句，即：主语从句、表语从句和宾语从句。此外可引导定语从句和地点状语从句。例：

(1) Where these two dissimilar kinds of air meet and interact is where and why most middle latitude weather occurs.

两种不同类型的气团相遇并相互影响的地方，就是大多数中纬度气象出现的地方和原因。（第一个 where 引导主语从句，第二个 where 引导表语从句。）

(2) Poles are simply the ends of a magnet where the flux density, or the concentration of lines of force per unit cross-sectional area, is greatest.

两极只不过是磁铁的两端，那里磁通量密度即单位横截面上磁力线的密度最大。（where 引出定语从句。）

(3) The student who has access to computer facilities should be encouraged to use them for the solution of occasional problems where a machine solution offers a distinct advantage.

在用计算机求解具有明显优点的场合，应鼓励有机会使用计算机的学生利用计算机来解少量的习题。（have access to...，“有机会使用……”，“可以使用……”。where 引出地点状语从句。）

(4) By seeing that there were unexplained differences between where a planet should be and where it actually was observed, Johannes Kepler opened the door for a correct picture of our solar system.

通过观察到在行星的应处位置和它被实际观察到的位置之间存在着未曾解释过的差异，约翰尼斯·开普勒打开了正确描绘我们太阳系的大门。（where 引出 between 要求的宾语从句。）

where 用法实例的分析与翻译

763. It is no longer necessary, as it was a century ago, to locate a factory or an industrial city near a stream where water power is available or on a harbour or river to obtain condensing water.

现在再也没有必要像一个世纪以前那样，把工厂或工业城市建在有水力的小河边，或者为了获得冷凝水而建在港湾或河流附近。（It 为形式主语，代替真正主语不定式短语 to

locate...obtain。 as it...ago 是方式方法状语从句， where 引导定语从句修饰 a stream。 to obtain...water 是目的状语， 修饰 to locate...。)

764. Wearing their thick space suits, astronauts learn to deal with an environment where there is neither weight nor gravity, neither “up” nor “down”.

宇航员们穿上厚厚的太空服，学着如何适应既没有重量也没有引力、既没有“上”也没有“下”的环境。(where 引导定语从句，修饰 an environment。)

765. In areas where water is not plentiful, three gallons a day are considered to be sufficient for man's drinking and cooking needs.

在水不充裕的地区，每天三加仑水就认为可满足人们饮用和烹饪之需了。(where 引导定语从句，修饰 areas。)

766. Where it is dry so much of the time that few plants can live, the destructive waters have their own way when the occasional rains come.

在长期干旱以致植物稀少的地方，偶尔降雨便会泛滥，造成灾害。(where it is dry... 是地点状语从句。其中 it 是无人称代词，可表示自然现象；that 引出结果状语从句，与句中 so 相呼应。)

767. This shows that a rocket will work best in a vacuum, where there is no air either to slow down the exhaust or cause air resistance at the nose.

这表明，火箭在真空中工作最佳，因为在真空中没有空气阻碍火箭排气，或在火箭头部形成阻力。(where 引导的是非限定的定语从句，修饰 vacuum，有“原因”的意味。在翻译时加上“因为”。)

768. Moreover, in any country where population presses hard upon natural resources, the general economic situation is apt to be so precarious that government control of capital and labour, production and consumption, becomes inevitable.

此外，在人口对自然资源造成严重压力的任何国家里，总的经济形势很不稳定，使得政府不得不控制资本和劳力，生产和消费。(where 引导定语从句，修饰 country。)

769. As we live on the planet where many forces are continuously acting we must be able to control these forces and the best way to do this is to know as much as we can about them.

既然我们生活在有很多力不断作用着的星球上，所以我们必须能够控制这些力。要做到这一点，最好的途径就是我们要尽量多地了解这些力。(about them 是 to know 要求的。as we can 是定语从句，can 后省略了 know，as 是关系代词，在从句中作 can know 的宾语。where 引导定语从句，修饰 planet。)

注：where 引导的地点状语从句，如果不是指具体的地点，这时地点的概念较弱，却含有条件的意味。翻译时，可不译成“在……地方”，一般可译为“如果……”，“在……情况下”，“在……时”等。

(1) Where the ohm is too small a unit, we may employ the kilo-ohm and the megohm.

如果欧姆这个单位太小，则可用千欧和兆欧。

(2) Where an atom is losing some of its electrons, there is said to be a positive charge existing.

在原子失掉一些电子的情况下，可以说是带了正电荷。

(3) Where the current to be measured is greater than that which the moving coil can pass safely, a device called a shunt is used.

如果要测量的电流大于动圈所能安全承受的电流，就要使用一种叫做分流器的装置。

(4) Where speed is vital, air-freight will be used for all except the bulkiest cargoes; and one day, even for these.

在强调运输速度重要的情况下，则要采用空运，大批量散装货物除外。但有朝一日，甚至这些大批量散装货物也会采用空运。

(5) Where an airport has several runways in different directions, the runway in use is the one which is most nearly into the wind.

在一个机场有几条不同方向的跑道时，通常都是使用那条最顺应风向的跑道。

while 的用法

while 可引导时间状语从句，让步状语从句和并列从句，例：

(1) Weight refers to a relation between a body and the earth, while mass is the measure of its inertia, which is independent of its position with respect to the earth.

重量涉及物体与地球之间的关系，而质量是物体惯性的度量，与物体相对于地球的位置无关。(while 在句中是并列连词，作“而”解。)

(2) Electricity, while very necessary for the operation of motors, is a very inefficient means of supplying heat.

电虽然对于马达的运转是必不可少的，但其供热效率却非常低。(while 引出让步状语从句，其后省去了 it is, it 代替 electricity。)

(3) A varying electric field causes slight shiftings of the positions of electrons in atoms and while these are taking place, they constitute a displacement current.

变化的电场会引起原子中电子位置的少许移动，当电子发生移动时，就会构成位移电流。(while 引出时间状语从句。)

while 用法实例的分析与翻译

770. While not every scientific fact is a numerical one, nor every scientific theory a predictor of numerical magnitudes, so many are that we cannot conceive of modern science without the process of measurement.

尽管不是每门科学事实都是用数字来表示的，也不是每一条科学理论都是数字大小的预测器，但是用数字表示的是如此之多，以致如果没有计量我们就不能设想有现代科学。(While 引导让步状语从句。主句是 so many are, are 后省略表语 numerical, nor 引起并列成分，在 theory 后省略 is。与 so 相呼应，that 引导结果状语从句。)

771. A good conductor of a given size has a low resistance, a poor conductor has a higher resistance, while a good insulator of the same size has an exceedingly high resistance.

一定尺寸的良好导体的电阻低，非良好导体的电阻较高，而同样尺寸的良好绝缘体则具有极高的

电阻。(while 连接两个并列分句，表示对比关系。)

772. A vapour is distinguished from a gas by the property that it can be liquified merely by compressing it, while a gas cannot be liquified without cooling it below a certain critical temperature.

蒸气与气体在下述性能上有区别：蒸气仅仅通过压缩就能液化，而气体则必须冷却到一定的临界温度以下才能液化。(be distinguished from..., “不同于”，“与……有区别”。介词短语 by the property 作状语，说明主句谓语行为的依据。that 引出同位语从句，用来揭示 property 的内容。介词短语 merely by compressing it 作方式方法状语。介词短语 without...temperature 用作条件状语。末句也可译成：而气体若不冷却到一定的临界温度以下就不能液化。while 是并列连词。)

773. Coal, while difficult to obtain, is easier than wood to handle as it can be reduced to small size by the simple process of crushing.

煤虽然难以开采，但比木材易于处理，因为可以通过简易的压碎工序使其成为碎块。(while 后省去了 it is, it 代替 Coal。while 引导让步状语从句。)

774. While evaporation is going on there must also be some solution of the gas molecules in the liquid, because occasionally a gas molecule, moving downwards, will pass into the liquid.

在蒸发过程中，也必然会发生气体分子溶解到液体中的现象，这是因为不时会有气态分子向下运动而进入液体中。(while...on 是时间状语从句，“当……的时候”。主句中 solution 是主语，must be 是谓语。)

775. Other means of transport requires friction or air for 'lift', while all need air in which to burn their fuel whether it is the petrol in a motor car or the oil in a ship.

其他的交通工具需要利用摩擦，或者为了“提升”需要空气，而所有的交通工具都需要空气来使它们的燃料燃烧，无论是汽车用的汽油还是轮船用的燃料油。(while 为并列连词。)

776. While there is a great deal that we do not know about the water that covers our earth's surface, we are learning more about it with each passing day.

尽管我们对覆盖地球表面的海洋还不十分了解，但是我们对它的认识正在日益深入。

(while 引导让步状语从句。)

777. While the mass of a body can ordinarily be considered constant, there is ample experimental evidence that actually it is a function of the velocity of the body, increasing with increasing velocity.

尽管通常可把物体的质量看成是恒定的，但实验充分证明，质量实际上是物体速度的函数，随着速度的增加而增大。(while 引出让步状语从句。that 引出同位语从句，进一步说明 evidence。分词短语 increasing... 作状语，起补充说明作用。)

778. Since a velocity has direction as well as magnitude, while a mass has magnitude only, the momentum of a body is a vector quantity the direction of which is that of the velocity.

因为速度不但有大小而且有方向，而质量则只有大小，因此物体的动量是一个矢量，其方向就是速度的方向。(the direction of which 是定语从句，which 代替 vector quantity。while 是并列连词。)

no matter how 与 whoever 的用法

因为以下几种词用法与 no matter how 相似或在意义上相同，故放在一起介绍：

- (1) whoever – no matter who;
- (2) whatever – no matter what;
- (3) whenever – no matter when;
- (4) wherever – no matter where;
- (5) however – no matter how。

这两种类型的词都引导从句，意义相近，但用法上有一些微略的差别，no matter 型的从句不能用作主语或宾语，whoever 型句子则可以这样用。如：

I'll eat whatever you give me. (正)

I'll eat no matter what you give me. (误)

no matter how 用法实例的分析与翻译

779. At twenty-five thousand miles per hour our rocket will escape from the earth's pull and travel wherever it is steered.

以每小时飞行 25 000 英里的速度，火箭便能摆脱地球引力，飞到它要去的任何地方。(wherever 引导地点状语从句。)

780. For the first 99.65% of the time that man has occupied the earth, he relied almost entirely upon his own muscles to perform whatever tasks were necessary or desirable.

在地球上出现人类最初的 99.65% 的时间里，人类几乎完全依赖自己的体力来做必要的或想要做的一切事情。(whatever 引导的是 to perform 要求的宾语从句，whatever 在从句中作 tasks 的定语。)

781. A locomotive does work while pulling a moving train, but if the brakes of the train should become locked so as to prevent motion, then no work would be done no matter how great a force the locomotive were to exert.

当机车牵引着列车行进时，机车在做功。但是，如果列车的闸刹住使列车不能运动时，则不论机车作用的力有多大，也不会做功。（while pulling 是分词短语，作时间状语，第二个并列句谓语用的是虚拟语气。so as 引出的不定式短语 to prevent... 是结果状语。no matter how..., “无论多么……”，引出让步状语从句。）

782. When Joule showed that whenever a given quantity of mechanical energy was converted to heat the same quantity of heat was always developed, the equivalence of heat and work as two forms of energy was definitely established.

每当一定量的机械能转变为热时，总会产生等量的热，焦耳证明了这一点，明确地确立了能量的两种形式即热和功之间的等量关系。（when 在句中是副词，“那时”。that 引出的宾语从句是 the same quantity...developed, 而 whenever...to heat 是宾语从句中的时间状语从句。develop 意为“产生”，“形成”。as two... 是 heat 和 work 的同位语。）

783. Density is the mass per unit volume – pounds per cubic inch or grammes per cubic centimetre or tons per cubic yard, however it may be expressed.

密度是单位体积的质量，或以磅/英寸³为单位，或以克/厘米³为单位，或以吨/码³为单位，怎样表示都可以。（however 在从句中修饰谓语 may be expressed, 引导让步状语从句。）

784. On account of the fact that there is always a resistance due to friction, wherever one part of a machine moves over another, some work must be done in moving the parts of the machine itself.

由于摩擦总要产生阻力，所以凡是机械的某一部件在另一部件上移动过的地方，在使机械部件运动时必然要做功。（on account of, “由于”。that 引出 fact 的同位语从句。wherever 引导地点状语从句。）

785. However difficult they may be to arrive at, choices will have to be made if we want to preserve the beauty and usefulness of the land.

如果想使土地保持美观和使用价值，我们必须作出果断的抉择，无论这种抉择是多么难以作出。（However 引出让步状语从句，它在句中修饰形容词 difficult。）

786. Electrons are elementary constituents of matter, their mass and electric charge being the

same from whatever elements they are obtained.

电子是物质的基本的组成部分，无论电子属于哪种元素，它们的质量与电荷都是相同的。(whatever 引出的是介词 from 的宾语从句。whatever 在句中作定语，修饰 elements。)

787. Pure water contains 8 parts by weight of oxygen combined with 1 part by weight of hydrogen, no matter what the source of the water may be.

纯水，不论其来源如何，是由八份重量的氧和一份重量的氢化合而成的。(of oxygen 是 parts 的定语，of hydrogen 是 part 的定语，均被状语 by weight 隔开了。no matter what 引导让步状语从句，what 在句中作 may be 的表语。)

788. No matter how small a drop of water we might study under the microscope, we could not see the hydrogen and oxygen whose union created the water.

不论我们在显微镜下研究的水滴是多么小，我们都看不见化合成水的氢和氧。(No matter... 引导让步状语从句。)

789. It is held that whenever two molecules of a gas come close together, attractive forces still act between them, though these forces are negligibly small.

人们认为，每当气体的两个分子聚集在一起，这两个分子之间就有引力作用，不过这种引力很小。(whenever 引导时间状语从句。)

790. Since energy is so often being transformed from one to another, it is wise to measure it in the same units, namely joules, whatever kind of energy it is.

因为能量经常由一种形式转变为另一种形式，所以无论哪种能量都以同样的单位即焦耳来测量是合理的。(whatever 引导让步状语从句，在句中作定语修饰 kind。)

791. No matter what forces acted in the past or what the present velocity of a body is, a given force applied along the line of motion will produce the same acceleration.

不论原来受过什么力的作用，也不论物体目前的速度如何，沿着该物体运动方向作用的一定的力，将产生同样的加速度。(让步状语从句中第一个 what 作定语，修饰 forces，第二个 what 作系动词 is 的表语。)

其他连词的用法

792. Conductors are usually metals, but solutions of acids, bases, and such substances in the molten state also permit the flow of electric charge through them, although the ability to conduct the charge is not so great as with metals.

导体通常都是金属，但酸、碱溶液以及它们处于熔融状态时也能让电流通过，可是它们的导电性能不如金属。(although 在句中为并列连词。)

793. There is a story of a Chinese of the 15th century who harnessed 47 large rockets to a chariot, though this brought him to an untimely end.

有一个故事谈及 15 世纪一个中国人，他把 47 枚大火箭装到一辆战车上，可是这使他过早地丧生。(bring...to an untimely end, “使……夭折”。though 在句中为并列连词。)

794. The molecules are still free to move about, but their cohesion is sufficient to give the liquid as a whole a definite size, although not a definite shape.

这些分子仍然可以自由运动，但分子的内聚力足以使液体作为一个整体具有一定的体积，不过不能使液体具有一定的形状。(although 在句中为并列连词。)

注：although (though) 作从属连词时，意为“虽然”，“尽管”；although (though) 用并列连词时，它有“可是”，“不过”等转折语气的含义。一般位于第一分句之后，前面应有逗号。

795. How energy and matter behave, how they interact one with the other, and how we control them make up the substance of two basic physical sciences, physics and chemistry.

能量和物质具有怎样的特性，它们怎样相互作用以及我们如何控制它们，这就构成了物理和化学这两门基础科学的内容。(句中三个 how 引出三个主语从句，它们的共同谓语是 make up。)

796. Even though in 2001 I would live at a time when work would be done by different kinds of machines, I still believe that machines can never entirely replace men.

即使在 2001 年，我生活在一切工作都可以用各种机器来完成的年代里，我仍然相信机器

绝不能完全取代人。(when 引导的定语从句修饰 time。)

797. This type of condenser was used until comparatively recent years, when the design and construction was considerably changed owing to the wide use of such units in the field of communication and power engineering.

这种类型的制冷装置一直沿用到最近几年,在这期间,由于通信和动力工程领域里广泛地使用这种装置,因而在设计和制造方面都有了很大变化。(when = during which time, “在这期间”。)

798. Once a vehicle has escaped from the gravitational field of the earth it has achieved the freedom of space and can reach the nearer planets almost as easily as the moon.

飞船一旦脱离地球的引力场,它就得到了空间的自由,因而就能像到达月球那样容易地到达较近的行星。(once 引出条件状语从句, and 连接两个谓语,这两个谓语之间有点因果关系,所以 and 可译为“因而”。)

799. The resistance of a circuit therefore does not depend upon the size of the current; that is, so long as the dimensions and physical properties of the circuit remain unchanged, the resistance is a constant for the circuit.

电路的电阻与电流的大小无关,也就是说,只要电路的尺寸和物理性质保持不变,这一电路的电阻就是固定的。(so long as, “只要”, 引导条件状语从句。)

800. Great progress in the study of space around the sun would be made provided an interplanetary station were created.

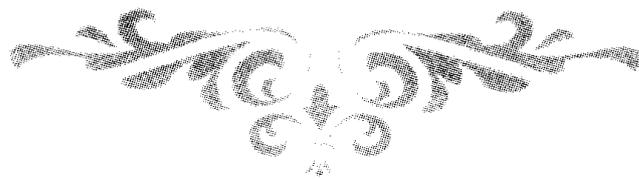
假如建立了星际站,对太阳周围空间的研究就会取得很大的进展。(provided 引出的条件状语从句中,谓语 were created 为虚拟语气。)

801. Hooke's Law of elasticity states that the deformation of a solid body is proportional to the force acting on it, provided the force does not exceed a certain limit.

虎克定律指出:只要固态物体所承受的作用力不超过一定的限度,则该物体的变形与此作用力成正比。

注:连词 provided (that) 意为“假如”,“如果”,“只要”,引导条件状语从句,这种从句谓语有时要用虚拟语气。动词要用原形,be 一律用 were。)

第八难点 标点符号



英语中标点符号有句号、问号、感叹号、逗号、分号、冒号、破折号、括号、引号和连字号。其中逗号是分析和理解长难句时的难点之一，本章中重点分析逗号的用法。

- (1) 逗号分开同等成分；
- (2) 逗号分开状语成分和状语从句；
- (3) 逗号分开有连词的并列分句；
- (4) 逗号分开无连词的并列分句；
- (5) 逗号分开独立定语和非限定性定语从句；
- (6) 逗号分开插入语或插入句；
- (7) 逗号分开同位语；
- (8) 直接引语前用逗号；
- (9) 逗号可用来表示省略。

运用逗号实例的分析

802. This heat energy, in turn, can be changed into electrical energy, which, when it is used for several purposes, may be changed either into light and heat energy, or into chemical energy.

这种热能又可以转换为电能，而电能用于各种不同目的时可以转换为光能、热能或化学能。(in turn, “又”，“也”，是插入成分；which 引出非限定性定语从句；when 引导的时间状语从句插在句中，这些情况都用了逗号。)

803. Altogether, the resistance of a particular conductor depends on, first, the specific resistance, secondly, the cross-sectional area and, thirdly, the length – the length, that is, of the “go” and “return” wires together.

总之，特定导线的电阻取决于：1)电阻率，2)横截面积，3)长度，即导线往返的总长度。(altogether, first, secondly, thirdly 这四个副词均用作插入语，要用逗号点开。破折号后为同位语。)

804. There is reason to believe that the ether in a magnetic field is in a state of strain – a condition similar to, but distinct from, that which obtains in the case of an electrostatic field.

有理由相信，磁场中的以太处于应变状态，这种情况类似于、但又不同于静电场中出现的情况。(to believe that... 是不定式短语，用来修饰 reason。similar to... 和 distinct from... 均为形容词短语，修饰 condition。介词 to 和 from 后面都有一个逗号，表明它们共有个宾语 that，that 是代词，代替 condition。)

805. For the certainty of the observation of the phenomena, one of the tendencies of the scientific observation is to be quantitative; another, the use of instruments as aids to the senses.

为了提高可靠性，科学观测的趋势之一是作定量观测，另一趋势则是使用仪器作为观测者感官的助手。(another 后面的逗号表示省略，即省略了 of the tendencies of the scientific observation is。)

806. Substances which we are not able, at will, to decompose into, or to make by chemical union from, other substances are called simple substances.

我们无法任意地将其分解成另一些物质、也无法由另一些物质通过化合作用将其制造出来的物质叫做单质。(at will, “任意”。作状语，前后用逗号与其他成分隔开。into 与 from 后都有一个逗号，表明它们共一个宾语 other substances。)

807. But the distortions created by these special progenitors of inflation – currency manipulation and wars – are themselves either products of, or means adopted to cope with, the unremitting instability of capitalism.

但是，造成通货膨胀的两大破坏因素——操纵货币和参与战争——本身既是资本主义不稳定的产物，同时又是用来对付资本主义经常不稳定局势的手段。(created by...inflation 为过去分词短语作定语修饰 distortions。currency 和 wars 是 distortions 的同位语，前后要用破折号与其他成分隔开。主语 distortions 和谓语 are 被这两个短语分隔开了。are 的两个表语 products 和 means 由连词 either...or 连接。adopted...to 为过去分词短语，作定语修饰 means。to cope with, “对付”。of 和 with 后分别有逗号，表明这两个介词共有一个宾语 instability。)

808. It follows from the above considerations that scientists, whether they like it, or not, are becoming involved in government, and hence in politics itself, to a far greater extent than ever before.

由以上考虑的各种因素我们可以了解到，不论科学家们是否愿意，他们都比以往任何时候在更大的程度上越来越卷入行政管理，从而也卷入了政治事务。(whether...or not 是让步状语从句，前后可用逗号。and hence 连接两个介词的短语，and 前可用逗号。to a far... 是状语，前面可用逗号。)

809. In addition a new industry has grown up which treats oil as a raw material for the provi-

sion of chemicals, which, important though it is, cannot be dealt with here.

此外,一种以石油为原料进行加工而提供化工产品的新工业已经发展起来了,这种工业虽然很重要,却不能在这里讨论。(第二个 which 引导的独立定语从句,which 前可用逗号。important though it is 是让步状语从句,前后要用逗号。)

810. Atoms combined into molecules in any ordinary substance, in, say, salt or washing soda, are, in the ordinary sense, in contact: the separation of their centres is about the diameter of atoms as found from, say, their behavior in a gas.

在任何一种普通物质中,譬如在食盐和洗用碱中,化合成分子的各个原子一般来说是相互接触的,原子中心之间的间隔大约相当于原子的直径,譬如,气体原子的情况就是如此。(say 作插入语; in salt or washing soda 是 in any...substance 的同位语; in the ordinary sense 是插入语,这几个地方都用了逗号。)

811. It is very essential that the engineer who is to be concerned with, and is to be responsible for, the selection of metals and alloys in industry should have a fundamental knowledge of chemistry, physics, thermodynamics, dynamics and mechanics to be most effective.

工业中将参与并负责选择金属和合金的工程师,必须掌握化学、物理学、热力学、动力学和力学的基本知识,这很重要,只有掌握了这些知识,他们的工作才能富有成效。(that 引导主语从句, it 是形式主语。is to be... 表示将要发生的行为。be concerned with,“参与”,“与……有关”。在介词 with 和 for 后分别有逗号隔开,表示这两个介词有一个共同的宾语 the selection。不定式短语 to be most effective 有“结果”状语的意味,用来说明 have。)

812. If you observe the Moon each evening at the same hour, you will notice that, apart from its apparent changes in shape, from 'new' to 'old', it, too, wanders against the starry background.

如果你每天晚上在同一时刻观察月亮,便会注意到,月亮除了在形状上有变化——从新月变为残月——之外,它的位置相对于星空背景也有所移动。(from 'new' to 'old' 用来说明 changes in shape, 是非限定性定语,前后要用逗号。too 作“也”讲时,前后应加逗号。apart from...in shape 是状语前后要用逗号隔开。that 引导的宾语从句中, it 是主语,谓语是 wanders。)

813. Bringing more water to the land, improving the soil, providing plant nutrients, teaching the farmer better cultural practices, giving him more efficient tools, etc, cannot yield maxi-

mum results unless the plants under cultivation are able to respond fully to the improved environment and practices.

为土地提供更多的水、改良土壤、给植物提供养料、教会农民较好的耕作方式，提供他们有效的农具等等，如果不能使耕种的农作物完全适应改善了的环境和耕作方式，那么上述这些措施就不能产生最大的效果。（五个动名词 Bringing...giving... 均用作主语，在这五个短语后都用了逗号，其谓语为 cannot yield。under cultivation 作定语修饰 plants。）

814. Yet at the same time, one cannot take them (Unidentified Flying Objects) too seriously, for before scientific education was widespread, even sightings of meteors, comets, auroras, and so on, gave rise to the most incredible stories, as they still do today.

与此同时，人们对待这些飞碟也不要太认真，因为在科学教育普及之前，甚至像流星、彗星、极光等景象也引起过一些令人难以置信的奇谈怪论，而且这类说法现在仍在继续流传。（as 引导的定语从句修饰 stories, they 代替 sightings of meteors...and so on, do 替代 give rise to。as 在从句中作 do 的宾语，as 代替 stories。yet at the same time 是时间状语，可用逗号。for 引导的从句前后可用逗号。）

815. We have learned laws of motion; the first deals with inertia; the second, with the change in motion of a body; and the third, with action and reaction.

我们已经学习了各个运动定律。第一定律研究惯性；第二定律研究物体运动的变化；第三定律研究作用力与反作用力。（the second 和 the third 后均有逗号，表示省略，省略了谓语 deals。）

816. Industrial pollution comes from waste products of the manufacturing and service industries, and these products are difficult, or at least expensive, to dispose of, while agricultural pollution results from the accumulation of toxic chemicals derived from pesticides and fertilizers.

工业污染来自制造业和维修业的工业废物。处理这些废物很难，至少处理费用昂贵；而农业污染则是由农药和化肥中有毒化学药品的积累而造成的。（在两个形容词 difficult 和 expensive 后分别用了逗号，这表明这两个形容词共有一个不定式作它的状语。不定式可用在作表语用的形容词后面作状语，说明产生这种情况的原因。）

817. The lack of air, the tremendous underwater pressure, the darkness, and the cold have all combined to prevent him from penetrating, for a great length of time, the deep ocean to observe

it first hand.

水下缺乏空气，巨大的水下压力，又暗又冷，这一切使海洋学家不能长时间地潜入深海直接进行观察。（动名词 penetrating 与其宾语 the...ocean 被介词短语 for...time 分隔开。）

818. This simple fact shows that the more of the force of friction is got rid of, the farther will one ball travel, and we are led to infer that, if all the impeding forces of gravitation and resistance could be removed, there is no reason why the ball, once in motion, should ever stop.

这一简单事实表明，摩擦力减少得越多，球会滚得越远。由此我们可以推论，如果能摆脱一切起阻碍作用的引力和阻力，球一旦运动起来，就没有理由再停下来。（get rid of, “摆脱”，“去掉”。the more..., the farther... 属于 the more..., the more... 句型。if 引导的条件状语从句和省略条件状语从句 once in motion 均插在句子中间，故前后要用逗号。）

819. In other words, the plants, the animals, and the environment – including the air, the soil, and the water – constitute a complex ecological system in which each factor and each individual is conditioned by, and in itself conditions, the other factors constituting the complex.

换言之，植物、动物以及包括空气、土壤和水在内的环境，构成了一个复杂的生态系统，其中每个因素及每个个体，即使处在自身的条件下，也要受到构成这一复合体的其他因素的制约。（by 所要求的宾语 the other factors... 被介词短语 and in itself... 分隔开。这个短语用作状语，前后要用逗号。）

820. This conclusion, reached by Dr S. I. Rasool and Dr S. H. Schneider, of the United States Goddard space flight centre, answers the apparently conflicting questions of whether an increase in the carbon dioxide content of the atmosphere will cause the earth to warm up or increasing the aerosol content will cause it to cool down.

这一结论是由美国高达德航天中心的 S. I. 拉素尔博士和 S. H. 施奈德博士得出的。它回答了两个看起来是相互矛盾的问题，即大气中二氧化碳含量的增加会促使地球变热，还是烟雾含量的增加会促使地球变冷。（reached by... 为非限定性定语，修饰 conclusion 前后要用逗号。of...centre 作定语修饰主语 conclusion，其谓语是 answers。whether...or... 引导两个 of 要求的并列宾语从句。）

821. A particularly important application of the computer in simplified form is as a component

in the control equipment of manufacturing processes – as the nerve centre which accumulates and analyses data recording the operating conditions and performances of the plant, and sends out instructions, when appropriate, for their modification.

计算机的特殊的重要用途就是以简化的形式用作生产流程控制设备中的一个部件。该部件是作为一种神经中枢。它可对记录工厂运转情况和执行情况的数据资料进行积累、分析。在适当时该中枢还可发布指令对数据加以修正。(as the nerve centre... 直到句末是 a component 的同位语, 该同位语前可加破折号。which 引导的定语从句中有两个并列谓语 accumulates 和 sends, and 可加逗号连接两个谓语。when it is appropriate 省略了 it is, 这种句子与 when possible 相类似, 它是状语从句, 前后可用逗号与其他成分隔开。their 指 data。)

822. As a lightweight, portable instrument, the minicomputer is not confined to a fixed position but can be taken to, or placed in, locations where it can solve difficult problems.

微型计算机作为一种重量轻的手提式装置, 不限于在某一固定地点使用, 而是可以携带到或放置在可以用它解决困难问题的地方。(As 引导同位语, 其后可用逗号, to 和 in 后都用了逗号, 表明共一个宾语 locations。)

823. We carefully distinguish velocity, which has both magnitude and direction, from speed, which we choose to mean the magnitude of the velocity, but which does not include the direction.

我们要注意把速度与速率区分开, 因为速度既有大小也有方向, 而速率只用以表示速度的大小而不表示其方向。(distinguish...from..., “把……与……区分开”。其中插入由 which 引导的非限定性定语从句, 前后要用逗号, 因而产生了动词与搭配介词之间的分离现象。)

824. According to the law of universal gravitations every material thing in the universe attracts, and is attracted by, every other material thing.

根据万有引力定律, 宇宙中的每个物体都吸引其他每一物体, 同时也受到其他每一物体的吸引。(thing 是两个同等谓语要求的宾语。在 attracts 和 is attracted by 后都要加上逗号。)

825. We now know that this attractive property may be imparted to a number of different materials by bringing such substances in contact with, or even near, a natural magnet.

现在我们知道, 把一些物质与天然磁体接触, 甚至靠近, 就可使这些物质具有磁性。(with 和 near 两个介词共一个宾语 a magnet, 在 with 和 near 都要用逗号。)

826. The use of electrical energy has developed rapidly because, in addition to becoming prevailing means of transmitting power initially generated by steam, water, or internal combustion engine, and replacing domestic factors such as candles, lamps and handlabor, it has given rise to many new ways all its own of rendering services.

电能的用途已经迅速地扩大，因为除了作为传输最初由蒸汽、水或内燃机发出的电，以及代替像蜡烛，油灯和手工劳动等家用品的一种普通的手段以外，电能还提供了很多独特的服务方式。（介词短语 *in addition to...and handlabor* 作状语，前后要用逗号与句中其他成分隔开。*because it has given...* 是原因状语从句被 *in addition to...* 分隔开了。介词 *to* 有两个动名词作其宾语：连接 *becoming* 和 *replacing* 这两个动名词短语的 *and* 前可加逗号。*all one's own*，“独特的，独自”。）

827. Will the day ever come when a robot, more powerful and more versatile than man and controlled by a computer brain, takes over from its human inventor?

会不会在某一天，由电脑控制的、比人的力量更大的万能机器人取代它的发明者——人类呢？（形容词短语 *more powerful...than man* 和过去分词短语 *controlled...brain* 构成一个非限定性短语，修饰 *a robot*。这个短语的前后要用逗号。）

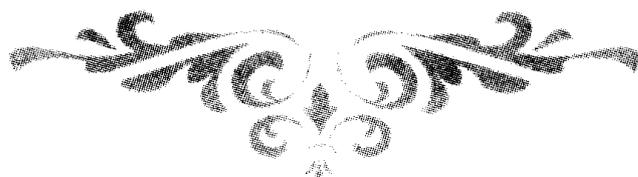
828. As a result the chemical industry has become the central industry of modern civilization, tending, because of its control over materials, to spread into, and ultimately incorporate, older industries, such as mining, smelting and building, and even through its concern with fertilizers and food processing, agriculture itself.

结果，化学工业已经成为现代文明社会的中心工业。由于它控制着材料，所以化学工业有向诸如采矿、冶金、建筑这样一些古老工业渗透的趋势，并且最终会把它们合并进去；由于化学工业与肥料和食品加工关系，化学工业甚至会渗入并最终把农业本身也合并进去。（本句为简单句，句中有9个逗号。分词短语 *tending...* 直到句末用作状语，有原因的意味。分词作状语时通常要用逗号与主句隔开。介词短语 *because of...* 前后用逗号，为独立状语。*into* 后和 *incorporate* 后都有逗号，表明这两者共一个宾语 *older industries and agriculture*。*such as...* 是 *older industries* 的同位语，前后要用逗号。*even through...* 是原因状语，前后用了逗号。句中分词短语主要结构是：*tending to spread into, and incorporate, older industries and agriculture.*）

829. At the present time, physics has progressed farther in this direction than any other science, and, in seeking to give a brief account of the present state of the science of physics, it must be our aim, not only to state the most important observed facts but also to show the relations and interdependence of these facts.

目前,在这一方面,物理学比任何其他学科进展得更快,因而在力图扼要地叙述物理这一学科的现状时,我们的目的不仅要介绍所观察到的最重要的事实,而且要阐明这些事实之间的联系及其相互依存关系。(seek + 不定式,“试图……”,“设法……”。give...account of...,“叙述”,“解释”。not only 和 but also 连接的两个不定式短语在句中作主语,it 是形式主语。in seeking...physics 介词短语作状语,前后要用逗号。)

第九难点 分离现象



在一般情况下，句中的某些成分应当放在一起，如主语和谓语，动词和宾语等，但有时却离得较远，被其他成分隔开了，这种语言现象叫做分离现象。起分离作用的主要有：

1) 各种短语：介词短语、分词短语、不定式短语等；2) 各种从句；3) 句中的附加成分：插入成分、同位语和独立成分等。

分离现象有主谓分离、动宾分离、复合谓语之间的分离、定语与被修饰语的分离、某些词与所要求的介词的分离、同等成分之间的分离。

分离现象实例的分析与翻译

830. A molecule is the very smallest possible bit you can have of any substance.

分子是任何物质中你能得到的最小单元。(of any substance 修饰 bit。)

831. An insulator is a material that offers a very high resistance to the passage through it of an electric current.

绝缘体是一种对通过它的电流产生很高阻力的材料。(of an electric current 是修饰 passage 的定语，被 through it 分隔开了。)

832. The phenomena of electricity at rest are both historically and practically of great significance in the development of science.

在科学发展过程中，静电现象在历史上和实践上都具有很重要的意义。(系词 are 和表语 of great significance 之间插入了两个副词。)

833. A compound differs from a mixture because the molecules of the elements that combine to make a compound completely lose their old individual qualities.

化合物不同于混合物，因为组成化合物的各元素的分子完全失去了它们各自固有的特性。(原因状语从句的主语是 molecules，谓语是 lose，中间插入了 that 引出的定语从句，造成主谓分离。)

834. A force is described as something which when applied to a mass causes it to move, if the mass is free to move, at an ever-increasing velocity.

可把力描述为某种作用，如果某一物体是可以自由运动的，这种作用加在此物体上就会使它以不断增大的速度运动。(when applied to a mass 是分词短语，作状语，也可看成是省略了 it

is 的状语从句，它把 which 与它的谓语 causes 分隔开了。at...velocity 是第一个 to move 的状语，第一个 to move 是 it 的宾语补足语。)

835. The ratio of the useful work done by a machine to the work done upon it is the efficiency of the machine.

机器所做的有用功与对机器所做的功之比，就是该机器的效率。(ratio of...to..., “……与……之比”。ratio 是主语，谓语是 is the efficiency, 主谓分离。)

836. Most of the drugs in current use were discovered by accident or by trial and error, and the cases in which a clear connection has been found between a drug's action in the body and its chemical and physical properties are few.

大多数目前应用的药物是由于偶然或反复试验而发现的，药物在人体中的作用和它的化学物理性质之间的明确关系的情况则鲜为人知。(第二个分句中主语 the cases, 谓语 are few, 被 in which... 定语从句分隔开了。trail and error, “逐次逼近，反复试验”。)

837. In recent years important discoveries have been made concerning the peculiar properties of certain semiconductors.

近年来，对某些半导体的特性已有了重要发现。(介词短语 concerning...semiconductors 作定语，修饰 discoveries。因为这一介词短语较长，所以把谓语提前。have been made 把修饰部分被修饰语隔开了。)

838. A galvanometer is an instrument that indicates, by the deflection of a pointer or a beam of light reflected from a mirror, the existence of a current through it.

电流计是一种根据指针的偏转或从镜面反射的光束的偏转来指示通过它的电流的仪表。(the existence 是 indicates 的宾语，中间插入 by 引出的介词短语，造成动宾分离。a beam... 与 a pointer 是介词 of 的并列宾语。)

839. Let consideration of how the behavior of capacitors is connected with electrostatics be deferred until later.

电容器的性能怎样与静电学联系起来？这一问题留待以后再研究。(本句为祈使句。be deferred 是省略 to 的不定式被动态，作 consideration 的宾语补足语。Let sth. do, be deferred 是

consideration 的补足语。宾语与宾语补足语分隔。)

840. A very important world problem – in fact, I am inclined to say it is the most important of all the great world problems which face us at the present time – is the rapidly increasing pressure of population on land and on land resources.

一个极其重要的世界性问题——事实上，我更倾向于说这是我们目前所面临的所有重大世界性问题中最重要的问题——就是人口对土地和土地资源的压力正在迅速日益增大。(主语...problem 与谓语 is the pressure 被句中一对破折号中的句子分隔开。)

841. The transfer of heat energy from one body to another when there is no material medium connecting them would seem to be the most mysterious of all thermal phenomena.

在没有任何介质把两个物体联系在一起的情况下，热可以从一个物体传递到另一物体，看来这似乎是一切热现象中最为神秘的现象。(The transfer... 是主语，谓语是 would seem 是谓语。主谓分离。)

842. That the air has real body and is not the empty space many of us have come to regard it, simply because we live most of our lives without becoming aware of the medium about us, may be demonstrated in a variety of ways.

可以用各种方法来证明空气是实体，而不是我们中很多人认为的那样是一个空间，这只是因为我们一生中大部分时间都意识不到我们周围介质的存在。(That the air...space 是主语从句，may be demonstrated 是其谓语。该句可改写为：It may be demonstrated in a variety of ways that the air...space. it 是形式主语，代替 that 引导主语从句，这种结构更常用。many of us...regard it 是定语从句，修饰 space。many of us regarded air as the empty space. come to do, “终于”。most of our lives 时间状语。be aware of, “意识到”。a variety of, “各种各样”。)

843. The energy of moving electrons is, in one way or another, utilized in almost every phase of modern communications systems – from reproducing your voice on the telephone to producing the color picture in your TV set.

现代通信系统的几乎所有方面——从在电话里复制你的声音到在电视机上产生彩色图像——都在以某种方式利用着运动电子的能量。(is utilized 复合谓语被介词短语 in one way or another 分隔开了。)

844. The theory of this phenomenon has been developed to such an extent that it is now possible, if one knows the density of the gas and the pressure exerted by it, to compute the probable average speed of the molecules.

关于这种现象的理论已经发展到这样的程度：如果已知气体的密度及其作用的压力，现在就可以计算出分子大概的平均速度。（不定式短语 to compute...molecules 在从句中作主语，它是形式主语。形式主语 it 与其所代替的不定式短语被条件状语从句分隔开了。）

845. This book should therefore be useful in an advanced undergraduate course in nuclear physics, to engineers interested in the large-scale application of nuclear physics.

因此，在核物理学方面的现代大学课程中，这本书想必对关心核物理大规模应用的工程师们是有用处的。（useful to..., “对……有用处”，“对……有帮助”。useful 与 to……之间插入了一个介词短语 in an advanced..., 而造成分离。）

846. There will be atomic jet-plane, we will be able to fly right up through the atmosphere, through the stratosphere, and away out into space, to the Moon, and Venus and the other planets.

将来会出现原子喷气飞机，我们能够径直穿过大气层、同温层，飞入太空，飞向月球、金星和其他星球。（fly...to the Moon... 被几个介词短语隔开了。）

847. The hard fact is that in a capitalist society the correction of a long stretch of inflation, and especially one that threatens to become hyper-inflation, can only take the form of economic depression.

铁的事实证明，在资本主义社会里，只有采取经济萧条的形式才能补救长期的通货膨胀，尤其是在出现恶性通货膨胀的时候。（one 代替 inflation, one 是 inflation 的同位语。that 引导定语从句，修饰 one。correction 是主语，谓语是 can take, 主语被同位语与其定语从句分隔开了。）

848. It is because of the particular properties of synthetics, such as being easily shaped, light and non-corrosive, that manufacturers prefer synthetic materials to metals.

正是由于合成材料具有特殊的性能，譬如容易成形、重量轻和耐腐蚀，所以生产厂家认为

合成材料优于金属材料。(It is...that... 为强调句型, it is 与 that 被同位语 such as... 分隔开了。)

849. Modern geology has for its aim the deciphering of the whole evolution of the earth from the time of the earliest records that can be recognized in the rocks to the present day.

现在地质学旨在揭示地球从远古时代至今的整个演变过程, 远古时代的遗迹可从岩石上辨认出来。(from the time...to the present day 被介词短语 of the...the rocks 分隔开。)

850. It is only when the plane passes through the sound barrier, either speeding up or slowing down, that the compression waves are encountered.

只有当飞机穿过音障(不论是加速或减速)时, 才会遇到压缩波的问题。(强调 only when...down 整个状语从句。It is... 与 that 被分词短语分隔开了。)

851. Natural science studies the mutual transformations, changes and development of concrete kinds of matter, brings to light the laws of natural phenomena and the relations between them.

自然科学研究各种具体物质的相互转换、变化及其发展, 并且阐明自然现象的规律及各种现象之间的关系。(studies 与 brings 是两个并列谓语, 由于第一个谓语有几个宾语, 所以这两个谓语离得较远。)

852. Yet wide reading is becoming increasingly important, for it is very frequently in the fields where several branches of science overlap that the most exciting results are obtained.

然而, 广泛的阅读变得日益重要, 因为正是在几个学科重叠交错的领域常常会取得振奋人心的成果。(本句是强调句型, 强调 very frequently in the fields, 因 fields 带有 where 引导的定语从句, 使被强调成分过长, 所以产生了 it is... 与 that 的分离现象。)

853. In terms of social change this meant that it was now accepted that activities previously regarded as the sole province (speciality) of a traditional specialist, the professional soldier for instance, could be usefully commented on by specialists from other fields, for example scientists.

就社会变革而言, 运筹学意味着以前只是传统专家——例如我是军人——的活动领域, 现在可以由其他领域的专家, 例如科学家, 来作出有益的评论。这种观点已被人们接受了。(In terms of, “按照, 根据, 就……而论”。it 为形式主语代替 that 引导的主语从句。主语从句中

主语是 activities, 谓语是 could be commented, 它们被 previously regarded as...instance 过去分词短语分隔。)

854. It was known to the Greeks as far back as 600 B. C. that certain substances, notably amber possess the property when rubbed with animal fur or fabrics of attracting light substances.

远在公元前 6 世纪, 希腊人就已经知道了某些物体特别是琥珀与动物毛皮摩擦时具有吸引轻小物体的特性。(that 引出主语从句。of attracting... 是 property 的定语, 中间被 when 引导的从句隔开了。)

855. Our ideas of nature – how it works, how it is constructed – grow in stature and strength as more and more observed facts can be fitted into our man-made schemes.

随着越来越多的观察到的事实符合人们的构想, 我们对大自然的认识——它怎样运转的, 怎样构成的——在深度与广度上都在不断地提高。(ideas 是主语, 谓语是 grow, 主谓分离。)

856. The remainders of the electrons are at some distance from, and appear to move in rather definite orbits about, the nucleus.

剩余电子与原子核保持一定的距离, 并且似乎沿着相当固定的轨道绕核旋转。(from 与 about 共一个宾语 the nucleus, from 与其宾语分离。)

857. Currently, the world's fastest aircraft, the Concorde, the West European Tornado fighter and Lockheed's Black-bird reconnaissance plane, cannot exceed Mach 3, or three times the speed of sound.

当前世界上最快的飞机——协和式飞机、西欧的旋风式战斗机以及洛克希德公司的黑鸟式侦察机等, 其速度都不能超过 3 马赫, 即音速的 3 倍。(主语 aircraft 与其谓语 cannot exceed 分离。)

858. Attempts to carry instruments to a great height for the study of various phenomena of the universe have been made for centuries.

多少世纪以来, 人们不断做出各种努力把仪器带到高空去研究宇宙中的各种现象。(attempts 是句中主语, 谓语是 have been made, 中间被作定语的不定式短语 to carry... 隔开了。)

859. The idea of writing this book was a result of frequent enquiries about the possibility of publishing in the English language a book on optics written in the German language by one of us more than twenty-five years ago.

由于读者不断地询问能否用英文出版一本有关光学的书，所以我们产生了写这本书的念头，而在 25 年多以前，我们的著者之一曾经用德文写过这本书。（本句是一个简单句，主语是 idea，谓语是 was a result。a book 是动名词 publishing 的宾语，中间被作状语的介词短语 in the English language 隔开了。过去分词短语 written in German language... 作定语，修饰 book。）

860. To understand the width and depth to which science can be applied to the material and spiritual problems that confront individuals and nations requires an understanding of what science really is.

为理解利用科学来解决个人和国家所面临的物质和精神问题所达到的广度和深度，就需要理解科学究竟是什么？（主语 To understand... 与谓语 requires 被 to which... 定语从句分隔开。）

861. Sodium chloride also has the property when it is dissolved in water, of producing a white precipitate when a solution of silver nitrate is added to it.

当氯化钠溶于水中，再加入硝酸银溶液时，氯化钠也具有产生白色沉淀物这一特性。（介词短语 of producing... to it 作定语，修饰 the property。因为这一介词短语很长，只好放在时间状语从句 when it is dissolved... 之后，避免头重脚轻，结果造成修饰语与被修饰语之间分离。）

862. The frictional force which every machine encounters in action and which causes some waste of energy will be neglected for simplicity in treating some of the simple machines.

每台机器在运转时都会受到摩擦力的作用并引起一些能量损耗，为了简便起见，在讨论某些简单机器时，这种摩擦力可以忽略不计。（主语是 force，谓语是 will be neglected，中间被 force 的两个定语从句隔开。）

863. Our need for water is constantly increasing. There is an automatic increase due to population growth, while the overall improvement of living standards, the fight against hunger through the irrigation of more land for food growing, and the creation and expansion of new industries, all foretell the need for even greater water supplies through out the world.

我们对水的需求不断地在增长。由于人口的增加，用水自然增加，同时，生活水准的全面改善；通过灌溉更多的土地来增加粮食生产以对付饥饿；新工业的建立和发展，所有这些都预示着全世界需要更多的水。（while 引导时间状语从句。句中有三个并列主语：the improvement, the fight, the creation and expansion, all 为总括词，谓语是 foretell。）

864. Experiments show that there is a definite relationship between the electrical pressure that makes a current flow, the rate at which the electricity flows and the resistance of the object or objects through which the current passes.

实验表明，使电流流动的电压、电流流动的速率与电流所通过的物体的电阻这三者之间有一定的相互关系。（the pressure, the rate, the resistance 这三个名词各有一个定语从句，因而 between 和这三个名词之间产生了分离现象。）

865. Let a glass containing a known volume of water be placed on one scale pan of a balance, while matter of any kind is added to the other pan until equilibrium is obtained.

把盛有一定体积水的玻璃杯放在天平一端秤盘上，而把任一物品加到天平另一端的秤盘上，直到平衡时为止。（be placed... 是 a glass 的补足语，宾语与其补足语被 containing... 分词短语隔开。）

866. This property that air has of taking up a large amount of water when cooled is the cause of our cloud and rain.

当空气冷却时，具有凝出大量水分的特性，这就是云和雨的成因。（that air has 是修饰 property 的定语从句。介词短语 of taking up... 作定语，也修饰 property。通常 that 引导的定语从句要靠近被说明的词，因此，介词短语只能放在定语从句之后。）

867. Ninety-nine people out of a hundred, if they were asked who first found America, would answer Christopher Columbus.

如果要问第一个发现美洲的是谁，100 人中 99 个人会回答：是克里斯托费·哥伦布。（主语 ...people... 与谓语 would answer 被 if 引导的条件从句分隔开。）

868. However, since calculation or logical processing that would take years if done by humans can be done in seconds or minutes by these machines, computers can be considered as extending the

intellect of human beings as a bulldozer extends their muscles.

但是，如果由人来进行计算或逻辑处理就要好几年时间，而计算机在几秒钟或几分钟就能完成。因此，计算机可以被当成是人的智力的扩展，就像推土机是人的肌肉的扩展一样。（since 引导的原因状语从句中的主语与谓语被 that 引导的定语从句和 if 引导的条件状语从句分隔开了。主语是 calculation 和 processing，谓语是 can be done。as...muscles 为方式方法状语从句。）

869. We consider the “cause” of a self-induced field, and hence of the emf associated with it, to be the changing current in the conductor.

我们认为感应电场的“起因”就是导体中变化的电流，因而可以认为与感应电场相联系的电动势的“起因”也是导体中变化的电流。（不定式短语 to be... 是宾语 the “cause” 的补足语。）

870. We are utilizing both solar and geothermal energy in limited amounts in a variety of installations but the possibility for large scale implementation of these sources to alleviate our power and attendant pollution problems seems very remote indeed.

我们正在各种设施中有限地利用太阳能和地热能，但大规模利用这些能源来缓和电力供应紧张随之而来的污染问题，这种可能性看来确实还很遥远。（主语 the possibility 与谓语 seems...remote 被介词短语 for...problems 分隔开。）

871. As soon as serious work is started on the design of apparatus making use of heating there is an immediate need for some method of measuring how hot or how cold a thing is.

一开始进行加热设备的设计工作，就会立即需要有某种测量物体冷热的方法。（介词短语 on the design... 作定语，修饰 work，因为这一介词短语较长，所以把谓语提前，产生了分离现象。）

872. And this is exactly what a radar set, the equipment that sends out wireless signals and receives their echoes, bases on.

而这正是雷达机——发射无线电信号并接收其回波的设备——工作的基础。（主语 a radar set 与谓语 bases 被同位语 the equipment... 分隔开。）

873. It is perfectly obvious that a chain reaction can be maintained only on condition that each fissioned nucleus produces, on the average, at least one secondary neutron which will cause the fission of another nucleus.

显然，只有在下述条件下才能维持连锁反应：每个裂变的原子核平均至少产生一个二次中子使另一个原子发生裂变。（第一个 that 引导主语从句。第二个 that 引导同位语从句。one secondary neutron 是 produces 的宾语。动词与宾语之间有两个介词短语 on the average 和 at least，因而造成动宾分离。）

874. In war the desire for survival which demanded the most effective use of all the resources of the country, and thus many social changes, brought about the birth of operational research.

战争中为了求生存，就需要最有效地利用国家的全部资源，从而要求社会进行各方面的变革，这就促成了运筹学的诞生。（主语 desire... 与谓语 brought about 被 which 引导的定语从句分隔开。）

875. At the present time chemists have obtained a remarkable insight into the dependence of the physical and chemical properties of substances on the structure of their molecules.

目前，化学家们对于物质的物理化学性质对其分子结构的依赖关系已有了深刻的认识。（dependence of...on..., “……对……的依赖关系”，dependence 与它要求的介词 on 被很长的介词短语 of the physical...substances 隔开了。）

876. But the subject is only a few years old and with the improvements in electronic techniques which may confidently be expected, and the rapidly increasing knowledge and understanding of the brain possessed by the medical profession, it would perhaps be unwise to forecast undue restrictions on the nature of the ultimate achievement.

但是这项研究项目才不过几年。随着充满信心地料想的电子技术的改进，随着医学对人脑的认识和理解越来越深入，现在就“预先”对这项最终的发展的性质作出不适当的限制，也许是很不明智的。（介词短语 with the improvement...and (with) the rapidly... 这两个 with 介词短语被 which 引导的定语从句分隔开了。）

877. Observation plays an important part in physics, but experiment, which consists in modi-

fying circumstances or events with a view to making more valuable observations, plays a more important part.

观察在物理学中起着重要的作用，但实验起的作用更为重要，因为实验可以不断地改变各种环境条件或过程以便作出更有价值的观察。（第二分句中主语 experiment 与谓语 plays 被 which 引导的定语从句分隔开。）

878. As helicopters get bigger and more efficient, more and more work will be found for them to do because they combine in one vehicle the lifting power of a crane with the carrying power of a lorry.

随着直升飞机机型增大和运载效率提高，越来越多的工作可以让直升飞机来完成，因为直升飞机把起重机的起吊能力和载重卡车的运载能力结合起来体现在一种运载工具上。（combine 与其宾语 the...power 被介词短语 in one vehicle 分隔开。）

879. The second aspect is the application by all members of society, from the government official to the ordinary citizen, of the special methods of thought and action that scientists use in their work.

第二方面就是从政府官员到普通公民，即所有社会成员都运用科学家在工作中所采用的思维和行动的特定方法。（of the work 介词短语用来修饰 the application，修饰语与被修饰语被介词短语 by...citizen 隔开。）

880. The reason we have found it most convenient to reduce all our measurements and all our graphic representations to length or distance is that our eye is our most convenient instrument of perception and our most sensitive one.

把所有我们要测量的物理量和图表都化为长度或距离，我们发现这样做是最方便的，其理由就是我们的眼睛是最便利而又最敏感的感知仪器。（we have...distance 是省略 why 的定语从句。The reason 是主语，谓语是 is，主谓分离。it 为形式宾语代替真正的宾语 to reduce...distance, to length 是 reduce 要求的。reduce...to, “把……归纳成”。one 是代词，代替 instrument。）

881. Evaporation from the soil and transpiration from vegetation are responsible for the direct return to the atmosphere of more than half the water which falls on the land.

土壤和植物的蒸发作用，是落到地面上的雨水有一半以上又直接返回到大气中的主要原

因。(介词短语 of more than half the water... 是 return 的定语, 由于该介词短语较长, 故将 to the atmosphere 提前, 造成修饰语与被修饰语分离。)

882. It was during the Second World War and the following years that a widespread understanding finally emerged of the fundamental role of science for industrial development of both civil and military applications.

正是在第二次世界大战期间以及其后的年代里, 人们终于普遍地认识到了科学对民用和军用工业的发展所产生的至关重要的作用。(介词短语 of the...role... 修饰 understanding, 被分词短语 finally emerged 分隔开。)

883. It is the business of the scientist to accumulate knowledge about the universe and all that is in it, and to find, if he is able, common factors which underlie and account for the facts that he knows.

科学家的事业就是积累有关宇宙和宇宙中的一切事物和现象的知识, 而且如果他能做到的话, 要去探索那些为他的知识奠定基础的共同因素, 而且要解释他所知道的事实。(to accumulate...and to find... 是主语, it 是形式主语。形式主语 it 与 to find 真正主语分离。)

884. One of the indications of the strength of European science during the first 25 years of this century is that out of the 71 Nobel prizes in physics, chemistry, and medicine, 68 were awarded to European scientists.

表明本世纪头 25 年间欧洲科学实力的例证之一, 就是在总共 71 位物理学、化学和医学诺贝尔奖得主中, 有 68 位是欧洲科学家。(One 是主语, is 是谓语, 主谓分离。)

885. According to the official definition, the term plastics applies to a large and varied group of materials which consist of, or contain as an essential ingredient, a substance of high molecular weight which, while solid in the finished state, at some stage of its manufacture is soft enough to be formed into various shapes – most usually through the application either singly or together of heat and pressure.

根据正式的定义, 塑料这个术语可应用于一组各种不同的材料, 这些材料作为混合物的基本成分是一种高分子物质, 尽管这种物质的成品是固态, 但在其生产的某个阶段, 它软得足以形成各种形状。通常通过加热或加压或两者兼用使其成型。(as an essential ingredient 是主语

which 的同位语，它把句中谓语 consist of 和 contain 的宾语 a substance 分隔开了。while 引导的是让步状语从句，省略了 it is, it 代替 a substance。which 引导定语从句，在句中作主语，谓语是 is。enough to be...shapes 是个副词短语用来修饰形容词 soft。most...through...pressure 是介词短语作方式状语修饰 to be formed。of heat and pressure 作 the application 的定语。either singly or together 是副词短语，说明 application，当然这不是规范英语，副词通常不能修饰名词。)

886. A successful scientist is sceptical – he does not accept statements which are not based on the most complete evidence available – and therefore rejects authority as the sole basis for truth.

成绩卓著的科学家对事物持怀疑态度——不轻易采纳那些没有最完全的根据的意见，因而他也拒绝承认权威是真理的惟一依据。(主语 scientist 有两个并列谓语，第二个谓语 rejects 可谓主谓分离。)

887. For several years the author has felt in his teaching the need for a book which would provide a through and rigorous introduction to college physics for students who intend to pursue scientific careers.

作者多年来在教学中感到需要有一本书，这本书会给打算从事科学事业的学生提供系统而严谨的物理学入门知识。(would provide 是虚拟语气，表示一种委婉的语气。through 在句中是形容词，意为“连续的”，“系统的”。the need for... 是 has felt 的宾语，被介词短语 in his teaching 隔开了。)

888. The entry not only of chemistry but to an increasing degree also of physics into chemical industry has here led to a radical break with the dirty, backward chemical industry of the early nineteenth century.

不仅是化学，而且物理学也日益进入化学工业领域，这就从根本上改变了 19 世纪早期的污染严重和落后的化学工业的面貌。(not only...but also 连接两个介词短语 of chemistry 和 of physics，它们都是 entry 的定语。介词 into... 是 entry 要求的。句中主语是 entry，谓语是 has led。)

889. The development of electric current as the means of providing power for the electric motor, heating, and illumination is one of the great engineering contributions of the early 20th century.

电流作为给电机、加热及照明提供能源的手段，它的发展是 20 世纪初期工程技术的伟大贡献之一。(as the means... 是 electric current 的同位语。主语 The development, 谓语是 is, 主谓分离。)

890. In war the desire for survival, which demanded the most effective use of all the resources of the country, and thus many social changes, brought about the birth of operational research.

在战争中为了求生存要求最有效地利用国家的全部资源，从而要很多社会改革，这就促使运筹学的产生。(主语 desire, 谓语 brought about “导致”，“引起”，“促使”，被 which... 引导的定语从句分隔开了。)

891. One of the problems of modern industry is the transportation of energy from the place at which it is available to the place at which it can be used most effectively.

现代工业的问题之一，就是如何将能量从开发地输送到可以最有效地利用能源的地方。(transportation of...from...to..., “把……从……输送到……”。from... 与 to... 两个介词短语之间有一个 which 引出的定语从句，使之产生分离现象，因而不易看出 transportation 与 to 的关系。)

892. Two of the great civilizations of ancient times emerged in the Middle East almost simultaneously in Mesopotamia, the land region lying between the Tigris and Euphrates rivers, and in Egypt, along the Nile River valley, where records show a united kingdom existing as early as 3100 B. C.

古代最伟大的两大文化几乎同时出现在中东，也就是在底格里斯和幼发拉底两河之间的美索不达米亚地区和尼罗河流域的埃及。在埃及历史记载表明早在公元前 3 100 年就存在一个统一的王国。(in Mesopotamia...and in Egypt, 这两个介词短语用来说明 Middle East。the land region...rivers 是 Mesopotamia 的同位语，lying between...rivers 为现在分词短语作定语修饰 region。介词短语 along...valley 作定语修饰 Egypt。where 引出非限定性定语从句，修饰 Egypt。as...as+ 数字表示事物数量上的“上限”和“下限”，即“高达……”，“低到……”。)

893. This idea that energy that a body has, due to position, is exactly equal to work done in giving it that position is more generally expressed in the fundamental and important principle of conservation of energy.

一物体由于所处的位置、状态而具有的能量，完全等于使该物体处于那种位置、状态所做的功，这一概念在能量守恒这一基本的重要原理中得到了更为概括的表达。（主句的主语是 idea，谓语是 is expressed。第一个 that 引出同位语从句，其中主语是 energy，谓语是 is equal。第二个 that 引出定语从句。分词短语 done in giving it that position 作定语，修饰名词 work。）

894. The properties of neutron-induced reactions were treated in Chapter 16 and examples were given of the ways in which these reactions give new information about nuclei.

在第 16 章中论述了中子产生反应的特性，同时还介绍了利用这些反应取得有关原子核新数据的各种方法的实例。（of the ways... 是 examples 的定语，因为 of 介词短语里又带有 which 引出的定语从句，结构比较长，所以把谓语提前，这样就产生了名词和它的定语分离的现象。）

895. A third distinction (between pure science and technology) is the restriction in technology of the field of interest; many phenomena of great scientific interest are useless to technology and are ignored by it – eclipses, for example, and earthquakes.

第三个区别（理论科学与技术之间）在于技术所关注的领域的局限性；很多具有重大科学意义的自然现象，例如日、月蚀和地震，对技术来说显得无用而被忽视了。（of the field of interest 修饰 restriction，被 in technology 分隔了。）

896. The finds of Chinese coins of the Tang (AD 618-907) and Sung dynasties on the East Africa coast together with the various references in China, Arab and European authors, do not seem sufficient to dispel all doubts as to whether voyages by Chinese to these shores, for commercial or diplomatic ends, were actually made before the advent of the Ming dynasty (1368-1644).

在非洲东海岸发现唐（618~907）和两宋的中国硬币以及中国、阿拉伯、欧洲各国的作者的著述似乎并不足以消除明代（1368~1644）以前中国人出于经商或外交的目的是否确实早就到达这些海岸的种种怀疑。（together with “和一道”，“连同一起”。例：John, together with his brother, has gone to the party. finds 和 reference 是主语，do not seem 为谓语。主谓分离。in...authors 为定语修饰 references。whether 引导宾语从句，句中主语是 voyages，谓语是 were made, for...end, “以……为目的”，是 were made 的目的状语。）

897. Owing to its vast extent, natural science has been divided, both on practical and intellectual grounds, into the physical sciences, such as chemistry, physics and geology, and the biologi-

cal sciences, such as botany, zoology and physiology.

由于自然科学范围很广，根据实践和理论，自然科学已分成物理科学（例如化学、物理和地质学）和生物科学（例如植物学、动物学和生理学）。（divided...into...and (into) the biological sciences.）

898. These repulsive or attractive forces, of electrical origin, exist in addition to the gravitational force of attraction and, in most situation with which we shall deal, are so much larger than the gravitational force that the latter may be completely neglected.

除了地心引力之外，还存在着电源的斥力或引力，在我们将要讨论的大多数情况下，电源的作用力比地心引力要大得多，因而地心引力可以完全忽略不计。（These...forces 有两个谓语 exist 和 are, are 与主语有分离现象。）

899. Every body continues in its state of rest or of uniform rotation about an axis fixed in direction, except in so far as it is compelled by external impressed couples, or by a force whose line of action does not pass through the centre of gravity of the body, to alter that state.

任一物体，除非受到外加力偶的作用或作用线不通过该物体重心的外力的作用来改变其原有的状态，那么就会继续保持它的静止状态，或继续保持绕着方向固定的轴作匀速旋转的状态。（except in so far as, “除非”，引导条件状语从句。分词短语 fixed in direction 作定语，修饰 axis。whose 引导的定语从句修饰 force，该从句把作状语用的不定式短语 to alter that state, 与谓语 is compelled 分隔开了。）

900. But the theory of generalized coordinates forms so essential a preliminary to the study of most branches of physics that the advantages of including a short treatment of this subject in the preliminary mechanics course will hardly be disputed.

但广义坐标的理论对于研究绝大部分物理问题来说是不可缺少的初步知识，因此在这本入门的力学教程中简要地讨论一下广义坐标的理论，其效益是毋庸置疑的。（与 so 相呼应，that 引出结果状语从句，中间插入了形容词短语 essential to..., “对……是不可缺少的”。that 引出的结果状语从句本身也是主谓分离的。）

第十难点 长难句



在阅读中，经常碰到长句结构，这是阅读中的重要难点。要解决长难句的问题，首先要了解构成长句结构的要素是什么？构成长句有两大要素：其一，五大短语和三大附加成分（插入语、同位语和独立成分）。其二，各种连词构成不同类型的复合句（并列复合句、主从复合句或并列主从复合句）。在这一认识的基础上，要掌握语法分析方法，分析是理解长难句的一种手段。通过对长句结构的分析，弄清词与词、句与句之间的关系，才能正确理解语言形式所表达的内容。实践证明，掌握语法分析手段这对成年人来说尤为必要。因为成年人理解能力强，通过对语言结构的分析，使我们能更快掌握长难句的奥秘。

(1) 简单句的分析方法和步骤。

简单句的结构有时并不简单，这时可采用“简化法”和“还原法”来分析。所谓“简化法”，就是把一个简单句简化成主语、谓语和宾语（主谓宾）或主语、系词和表语（主系表），而把句子的其他成分（各种短语所表示的成分和附加成分）暂时放在一边，这样便抓住了句子的主要矛盾。所谓“还原法”就是把句子简化后再逐个分析各个修饰性的短语在句中的作用，分析主要成分与句中其他成分之间的关系，然后依次逐个加进主谓宾或主系表的主要成分中，使句子复原。例：

In this way they will best be able to apply their knowledge and experience in one or more of the familiar fields of engineering to the solution of the special problems arising from the use of atomic energy as a source of power.

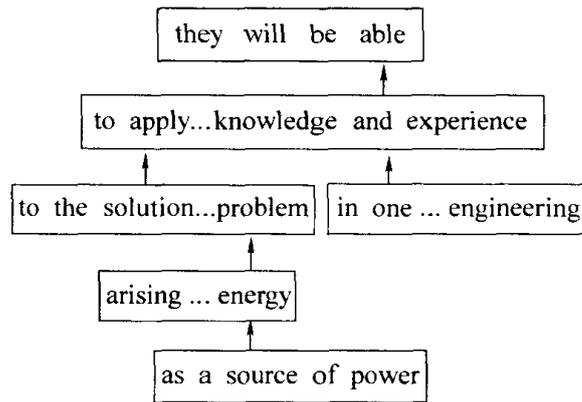
本句为简单句。

第一步：找出主要成分：they will be able
主 系 表

第二步：列出句中各个短语：

- 1) In this way
- 2) to apply their knowledge and experience
- 3) in one or more of the familiar fields of engineering
- 4) to the solution of the special problems
- 5) arising from the use of energy
- 6) as a source of power

本句有6个短语：4个介词短语、一个不定式短语和一个分词短语。in this way 用作插入语；不定式短语 to apply... 是 able 要求的状语；介词短语 in one or more... 作定语修饰 knowledge and experience；介词短语 to the solution 是 apply 要求的间接宾语；分词短语 arising... 用来修饰 problem；介词短语 as a source... 是 atomic energy 的同位语。图解如下：



第三步：翻译：由此可见，他们最好能把所熟悉的一个或更多工程领域里的知识和经验，用来解决在利用原子能作为能源方面所产生的一些特殊问题。

(2) 复合句的分析方法和步骤。

第一步：先把复合句分成一个个简单句。主要看连词，因为连词会引出一个从句或一个并列句。

第二步：分析各个简单句中各成分之间的关系。

第三步：分析从句与主句和各从句之间的关系。

第四步：翻译。

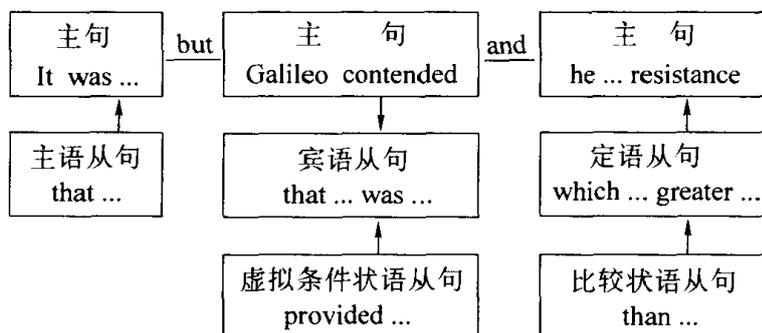
分析举例：

It was originally surmised that different bodies fall to the ground at rates proportional to their respective weights, but, towards the end sixteenth century, Galileo contended that the rate of fall was the same for all bodies – provided gravity were the only force acting – and he attributed the slower rate of fall observed on the case of a light body to the resistance of the air, which exerted a relatively greater effect on a light body than on a heavy body of the same size and shape.

第一步：本句是并列主从复合句。共有八个句子，三个主句，五个从句。

第二步：各句各成分之间关系（略）。

第三步：各句之间的相互关系图解如下。

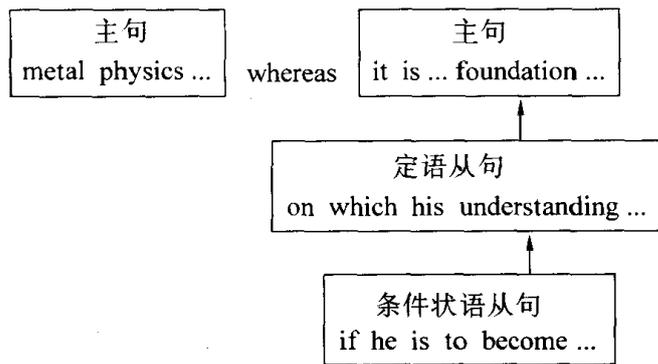


第四步：翻译：原先人们曾猜测，不同的物体落到地面上的速度是与各自的重量成正比。但是到了16世纪末叶，伽利略坚决主张，若重力是惟一的作用力，则所有物体的降落速度都是相同的，他并且认为，人们观察到的轻物体降落速度较慢是由于空气的阻力引起的，因为空气阻力对轻物体的影响要比对同样大小同样形状的重物体的影响大得多。

长难句实例的分析与翻译

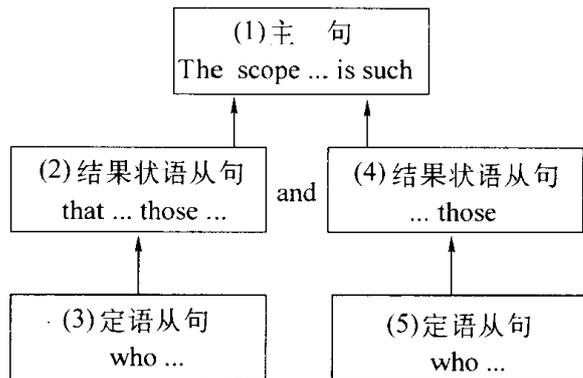
901. After all, to the physicist, metal physics is but a small branch of the wider field of solid state physics, whereas to the metallurgist it is the foundation on which his understanding of the behaviour of metals must be based if he is to become the pioneer of new and hitherto unimagined industrial development.

对于物理学家来讲，金属物理学毕竟只不过是固体物理学这个范围更广的领域中的一个小小的分支而已；而对于冶金学家来讲，如果他希望成为至今人们还想像不到的工业革新的先驱者，金属物理学则是他通晓金属性能的基础。（本句为并列主从复合句。）图解如下：



902. The scope of the book is such that it should provide a solid foundation for those who intend to select optics as a career and at the same time it should furnish an adequate knowledge of the subject in a comprehensible form for those who intend to specialize in other branches of physics or engineering.

本书涉及的范围可以为那些打算选修光学专业的读者提供牢固的基础知识，同时也可作为打算研究物理学或工程学等其他专业的读者以综合的形式提供这门学科的丰富知识。图解如下：



903. It is the atmosphere that gives us life and protection; that warms and shields us by night from the fierce cold of outer space; that gives us all the changes of weather, and softens the strong light of the sun by day, diffusing and spreading the varied light and colour of the open air.

正是大气层给了我们生命和保护，也正是大气层给了我们温暖，在夜间保护我们不受来自外层空间的严寒的袭击；还是大气层给我们带来了各种天气变化，使白天的强烈阳光变得柔和，漫射并发散户外多变的光和颜色。（It is...that 为强调句型，强调主语 atmosphere。有 5 个并列谓语：gives, warms, shields, gives 和 softens。diffusing and spreading...air 是现在分词短语作状语，作补充说明。）

904. Taking man's civilized past at about to seven or eight hours, we may estimate his future, that is to say, the whole period between how and when the sun grows too cold to maintain life any longer on the earth, at about one hundred thousand years.

假设取人类的文明史为七八个小时，我们可以以此来推算人类的未来，这就是说，从现在起到太阳变冷再不能维持地球上的生命为止，整个这段时期大约估计为 10 万年。（estimate sth. at..., “估计……为（达）”。estimate 与 at 的分离是由插入成分 that is to say... 所造成的。）

905. On the theoretical side it was felt that physics was fast approaching the status of a dead classical subject so completely worked out in detail as to leave very little of interest, if anything at all, for future generations to unravel.

在理论方面，当时认为，物理学已经被人们充分而细致地研究过了，正在很快地接近一种没有生气的经典学科的状况，因此没有什么令人感兴趣的问题有待于后人去探索解决了，如果有的话，也是寥寥无几了。（if anything at all, “即使有的话”，这种结构通常与 little, few,

seldom 等否定词连用。)

906. As a result of two or three centuries of scientific investigation we have come to believe that Nature is understandable in the sense that when we ask her questions by way of appropriate observations and experiments, she will answer truly and reward us with discoveries that endure.

由于两三个世纪以来科学研究的结果，我们逐渐相信：如果运用合适的观察和实验方法向大自然探究问题，从这个意义上来说，大自然是可以认识的。她会真心实意地给我们答复，并且以永垂不朽的发现来报答我们。(come to do, “逐渐，终于，开始”。in the sense that..., “在... 意义上”。that 引导同位语从句。by way of... “通过……方法”，作方式方法状语，来说明谓语 ask。endure, “忍耐，忍受，坚持”。)

907. Galileo also showed that spherical, and cylindrical, bodies rolled down an inclined plane with uniform accelerations, the acceleration having one value for the spheres, and another for the cylinders but being independent, in both cases, of the masses of the rolling bodies.

伽利略还指出过，球体和圆柱体沿着斜面向下滚动都是匀加速运动，二者的加速度值不同，但在这两种情况下，它们的加速度均与滚动体的质量无关。(spherical 和 cylindrical 是两个并列定语，均说明 bodies。the acceleration having...but being... 是分词独立结构，起状语作用，作补充说明。)

908. Not until 1960 early 50 years after Albert Einstein first described the basic principle of laser, did Theodore Maiman, a 33-year-old engineer at Hughes Research Laboratories, build a homely four-inch cylinder containing a ruby rod encircled by a flash tube: the world's first working laser.

直至 1960 年，也就是在阿尔伯特·爱因斯坦首次阐述激光的基本原理 50 年之后，休斯研究实验室一位 33 岁的工程师西奥多·梅曼才制成了一个并不显眼的长 4 英寸的圆柱体，其中装有一根套着闪光管的红宝石棒，这就是世界上第一个实用的激光器。(谓语 did build 被同位语 engineer... 分隔了。这句是部分倒装，因有否定词 Not 在从句句首，主句主谓语要用倒装语序。)

909. It was Professor Niels Bohr, the Danish physicist, who in 1913 suggested that certain important observed fact could be accounted for if we think of the orbital electrons as occupying, at

any given instant, certain definite energy states or energy levels.

正是丹麦物理学家尼尔斯·波尔教授在 1913 年提出：如果我们认为轨道电子在任一瞬间均具有一定的能态或能级，那么这一观察到的重要事实就能得到解释。（本句为主从复合句。本句中有一个分离现象。certain...levels 是 occupying 的宾语，被介词短语 at any...instant 分隔开了。）

910. In a single second light crosses a space equal to eight times the circumference of the earth; and therefore in travelling from any visible object on the earth to the eye of an observer on the earth, light occupies a space of time indefinitely short.

仅在 1 秒钟内，光所通过的距离等于地球周长的 8 倍，因此，光从地球上任一可见的物体传到地面上观察者的眼睛只需要极短的瞬间。（本句并列复合句，equal to... the earth 是形容词短语，修饰 a space。句末 indefinitely short 也是形容词短语修饰 time。）

911. The advent of jet and rocket propulsion, and of nuclear reactors, has shown that the materials which previously served for constructional purposes are no longer wholly satisfactory for the manufacture of equipment on which the efficient functioning of these new sources of power depends.

喷气发动机、火箭推进器以及核反应堆的出现都表明，原先使用的结构材料，对于保证这些新动力源的有效功能所必需的设备的制造，已不再完全令人满意了。（本句为主从复合句，有 4 个句子，一个主句，一个宾语从句。由 which 引导两个宾语从句。and of...reactors 修饰 advent。）

912. It may never have occurred to Galileo that the regions between our earth and the planets might contain phenomena which have an everyday effect on our lives, regions which scientists later found to be teeming with electrons, protons, ions, magnetic fields, hydromagnetic waves, micrometeorites, and radiation with frequencies from direct current to cosmic rays.

伽利略可能从来没有料想到，地球和各行星之间的空间可能包含着对我们日常生活每天都有影响的一些现象，后来科学家们发现这些空间里充满着电子、质子、离子、磁场、磁流体波，微小陨石以及具有从直流电到宇宙射线频率的辐射。（It occurs to sb. that..., 某人想到。It 是形式主语，that 引导主语从句。第二个 regions 是第一个 regions 的同位语。which scientists...found...which 在句中是谓语的宾语，to be teeming... 是 found 要求的宾语补足语。teem with, “有很多，充满，富于”。with frequencies...rays 作 radiation 的定语。）

913. The fact that our eyes are sensitive to red light, while many photographic plates are not, whereas photographic plates are sensitive to the invisible ultra-violet radiation, is entirely due to the differences between the chemical structures of the eye's retina and of the photographic emulsion.

我们的眼睛对红光很敏感，而很多照相底片则不能，反之，照相底片对不可见的紫外辐射却很敏感，这种情况完全是由于眼睛视网膜与底片感光剂在化学结构上的差异而引起的。（主语 The fact 与谓语 is...due to 被 that 引导的同位语从句以及 while 与 whereas 引导的句子分隔开。）

914. These new observational capabilities would result in simply a mass of details were it not for the fact that theoretical understanding has reached the stage at which it is becoming possible to indicate the kind of measurements required for reliable weather forecasting.

现在理论上的认识已达到了这样的阶段——现在已能指出，需用哪种测量方式才能可靠地预报天气，如果做不到这一点，那么上述这些新的观察能力只不过提供一大堆细节而已。（本句为主从复合句，共有 4 个句子，一个主句，were it not for the fact 是省略 if 的虚拟条件状语从句。that 引导同位语从句，which 引导定语从句。）

915. Gold and silver were regarded as noble metals because they could be exposed to the atmosphere for a long time without tarnishing, and because they could be melted repeatedly without much loss in weight. These characteristics led to their being used for jewellery and eventually coinage.

金和银被认为是贵金属，因为它们能长时间暴露在空气中而不失去光泽，是因为它们能在反复熔炼后而不减轻重量。这些特性使得金银成为珍宝，最后用来作为金属货币。（动名词 tarnishing 作 without 的宾语。being used 是动名词被动态，作 to 的宾语，their 的动名词的逻辑主体，代替 gold 和 silver。）

916. The chemical properties are determined by the character of the molecules; but the physical properties depend also upon the force the molecules exert on each other, and the relation of these forces to the distance between molecules.

化学性质取决于分子的特性；而物理性质也取决于分子之间的相互作用力及其与分子之间距离的关系。（the molecules exert on each other 是省略关联词的定语从句，修饰 the force。）

917. Although magnets have been known for thousands of years, it is only about two centuries

since we learned much about why they have attracting properties and why freely suspended magnet is always pointing north and south.

虽然人们知道磁铁已有几千年了，但只是在近两百年来我们才对磁铁为什么具有吸引的特性，为什么自由悬挂的磁铁总是指南北方向有了更多的认识。（本句为主从复合句，it is only... 为主句，Although 引导让步状语从句，since 引导时间状语从句。两个 why 引导的均为 about 的宾语从句。）

918. In very early times man must have had much valuable information regarding the physical results of various actions and processes but it was only when attempts were made to systematize and arrange this knowledge and to seek the relations between the different facts that the science of physics began.

人类在很早以前想必就已经掌握了有关各种作用力和作用过程等物理结果方面的大量有价值的知识，但是，只有当人们做出种种努力把这些知识系统化、条理化并且找出各种不同事实之间的相互关系时，才产生了物理学这门学科。（must + 现在完成时有“想必已经……”的含义。but 连接的第二个并列句是强调句型，强调 when 引导的状语从句。因为状语从句较长，所以产生了 it was... 与 that... 的分离现象。）

919. Nearly all our clothes are made from fibres of one sort or another, be they derived from plants, animals, coal or petroleum and all these fibres, when they are carefully examined, are seen to consist of long chain molecules.

我们所有的衣服几乎都是由某种纤维制成的——不论这种纤维来源于动物、植物，还是来源于煤或石油；我们若仔细研究这些纤维，就会知道它们都是由长链分子组成的（be they... 这是一种无连词的让步状语从句。）

注：有时让步状语从句不用连词，而用倒装语序，这时谓语的一部分通常是 be，be 要用原形，放在从句的句首。

920. All the medicines in the world, be they never so revolting, will be unavailing if there is insufficient food in a man's stomach.

世界上所有的药物，不论它怎样不使人恶心，如果胃里缺乏食物，也是无济于事。（be they never so revolting 是无连词的让步状语从句，倒装语序，主语是 they，谓语是 be revolting。）

921. To obtain close tolerances in milling, it is important that the machine be in good mechanical condition, that the workpiece be of suitable structure and composition, that the cutter be properly selected, and that feed and speed be appropriate to the particular application.

为了获得高精度的铣削公差，重要的问题在于：机床必须处于良好的机加工状态；工件要具有合适的结构和性能；要选好刀具，对于特殊的用途进刀量和速度要适度。（句中4个that引导的句子均为主语从句。it is + 某些形容词 + that... 的句型中，that引导的主语从句中，谓语要用虚拟语气，谓语用原形动词，句中用了4个be即是。）

922. Since all materials are subjected to expansion and contraction, “expansion joints” must be provided in any large structure to adapt to the change of temperature with the seasons, or even with day and night, otherwise the force of expansion would cause the structure to bend or break.

因为所有的材料都要经受膨胀和收缩，所以在任何大的结构物中都需要提供“伸缩缝”，以适应随着季节甚至昼夜的更迭而产生的温度的变化，否则膨胀力就会使结构物弯曲或断裂。（otherwise引导的句子中谓语常用虚拟语气。）

923. Were a man to kick a body in outer space, he would find out that the act would hurt his foot as much as it does here on Earth, because the mass of the body would be the same in both places.

如果一个人在外层空间踢一个物体，他会发现这一动作使他的脚感到伤痛的程度，就像在地球上踢的结果一样，因为该物体的质量在这两个地方都是相同的。（were a man to kick a body... = if a man were to kick a body...。be + 不定式表示将要做或打算要做的意思。）

924. Yet even as regards such objects as these, light has occupied a real interval of time, however small, in reaching the eye; and so we see objects not as they are at the moment we perceive them, but as they were the smallest fraction of a second before that.

然而，即使就这样的物体来说，不论所需的时间是怎样短，光毕竟还需要一点时间间隔才能进入人的眼睛。所以我们看到的物体，不是我们看到它那一瞬间的物体，而是在看到之前那一瞬间的物体。（however后省略了it may be。）

925. If you double the distance between two objects, their gravitational attraction decreases

“two times two” . If you treble the distance, it gets nine times weaker (three times three) . If you take it four times as far away, it gets sixteen times weaker (four times four) and so on.

如果你把两个物体之间的距离增加一倍，它们之间的引力就减少到 $1/4$ (2×2)。如果把距离增大到 3 倍，该引力就只有原来的 $1/9$ (3×3)。如果距离增加到 4 倍，则引力就只有原来的 $1/16$ (4×4)，依此类推。(英语中常用倍数表示减少的量，而汉语中则习惯用分数或百分数来表示减少的量，因此，在翻译时，应将英语的倍数换算成分数或百分数。通常可译成：“减少了几分之几，或减少了百分之几”。如：decrease n times 可译成：减少到 $1/n$ ；或减少了 $(n-1)/n$ 。如 A is four times smaller than B. A 比 B 小 $3/4$ 。或：A 是 B 的 $1/4$ 。但在有些语法书中提到这种结构时，认为应在分母上加 1，即：减小到 $1/(n+1)$ ，或减小了 $n/(n+1)$ 。这种看法值得商榷。)

926. I believe that the most important forces behind the massive M&A wave are the same that underlie the globalization process: falling transportation and communication costs, lower trade and investment barriers and enlarged markets that require enlarged operations capable of meeting customers' demands. All these are beneficial, not detrimental, to consumers.

我相信，推动大规模兼并和收购的重要力量也就是推动全球化过程的同一力量。全球化过程意味着降低运输和通讯的费用、减少贸易和投资的壁垒、扩大市场，这就要扩大能满足顾客需求的大的经营范围。所有这一切对消费者有百利而无一害。(behind...wave 为定语修饰 forces。M&A 是 mergers 和 acquisitions 的缩写。same 后省略 forces。that 引导定语从句。underlie 支承，构成……基础。falling 降低(及物)动名词。lower 减少(及物)。capable of...，(做)……的能力，是形容词短语作定语修饰 operation。beneficial 和 detrimental 后都有一个逗号是因为这两个形容词共用一个介词 to。冒号后三个短语用来对 globalization process 加以说明。)

927. Whether it is cheaper to ship coal from the mine into a city and generate electric energy in the city, or to generate electric energy at a coal mine or a remote water power site and “step it up” to high voltage and transmit the energy to the city in the form of electric energy is usually a question of economy.

将煤从矿山运入城市，然后在城里发电来得合算，还是在煤矿或水力所在地发电，然后将电升到高压再输送至城市来得合算，这通常是一个经济核算问题。(Whether...in the form of electric energy 是主语从句，谓语是 is, a question 为其表语。主语从句中 it 是形式主语，代替真正主语：to ship coal..., to generate...energy..., to generate energy at...site, (to) step it

up..., (to) transmit...energy, 一共有五个不定式做主语。)

928. Henri Becquerel was interested in the phenomena of fluorescence, which is the property certain substances have of accumulating the energy of light falling upon them and of remaining luminous for a certain time after the source of light has been removed.

亨利·贝克勒尔对荧光现象很感兴趣。荧光现象是某些物质具有的一种特性，即这些物质被光照射后可把光能积累起来，在光源撤去后还能在一段时间内继续发光。(介词短语 of accumulating...and of... 修饰 the property, 被省略了关系代词的定语从句 certain substances have 分隔开。)

929. What is a computer? One definition might be this: A computer is a device that takes in a series of electrical impulses representing information, combines them, sorts them, analyzes and compares the information they represent with information stored in the computer.

计算机是什么？一种定义也许可以这样下：计算机是一种接收一系列表示信息的电脉冲的装置，它把这些电脉冲加以综合、分类，并将电脉冲所表示的信息对照计算机中所储存的信息加以分析和比较。(that 引导的定语从句有 5 个并列谓语：takes、combines、sorts、analyzes 和 compares。they represent 是省略 that 的定语从句，用来修饰 information。with information 是 compares 要求的宾语。)

930. The mechanical engineer must study the properties of metals and alloys and must have an understanding of their behaviour under stress and strain, expansion and contraction, and friction, and the ways in which they can be changed by heat treatment.

机械工程师必须研究金属和合金的性能，必须了解它们在应力和应变、膨胀和收缩以及摩擦力作用下的特性，此外还要了解这些金属和合金经过热处理后的变化情况。(本句共用了六个 and, 正确理解 and 连接的成分是关键。第二个 and 连接两个谓语，表示深入一层的意思，可译“并且”。第五个 and 连接三个并列成分，即：“应力和应变”、“膨胀和收缩”及“摩擦”。最后一个 and 把 behaviour 与 ways 连接起来，这两个词均为 of 的宾语。)

931. Although water normally freezes at or very near the accepted freezing points (32°F, 0°C), small droplets making up clouds can be cooled by natural processes to temperatures far below the normal freezing point and remain in the liquid state.

水通常在公认的冰点 (32°F, 0°C) 或非常接近冰点时结冰, 而构成云的微粒却能在自然过程中冷却到远低于通常冰点以下, 仍能保持液态。(分词短语 making up clouds 用来修饰 droplets。)

932. It is now possible to add or subtract two large numbers in one to two microseconds, and to multiply or divide them in ten to twenty microseconds, so that a computer can perform as much arithmetic in a quarter of an hour as an efficient clerk with pencil and paper might reasonably hope to achieve in a lifetime.

现在已可能在 1~2 微秒内完成两个大数的加减运算, 或在 10~20 微秒内完成它们的乘除运算, 因而一台计算机在一刻钟里完成的计算量相当于一个高效率的办事员用笔和纸可望在他一生中所完成的计算量。(so that 引导结果状语从句。与 as much 相呼应, as 引导定语从句, 在句中作 to achieve 的宾语, as 在句中为关系代词。)

933. By the end of the eighteenth century, scientists working in many European countries using many different chemical reactions took for granted that the total mass of their products was equal to the total mass of the reactants they had used.

截至 18 世纪末, 在欧洲各国工作的科学家们曾应用过许多不同的化学反应, 他们认为化学反应生成物的总质量理所当然地应当等于所用的反应物的总质量。(they had used 是省略关联词的定语从句。)

934. Almost everyone has seen horseshoe magnets – so called because they are shaped like horseshoes. Probably you have experimented with a magnet, and noticed how it will pick up tacks and nails, or other small iron objects. Men have known about magnets for thousands of years.

几乎每个人都见过马蹄形磁铁, 这种磁铁是因为形状像马蹄而得名。你们可能对磁铁进行过试验, 并注意到磁铁会吸起平头钉和钉子或其他小的铁制品。人类了解磁铁已有几千年了。(has seen, have experimented...and noticed 均为现在完成时态, 表示从过去到现在这段时间中所发生的事。have known 也是现在完成时态, 因为有介词 for 构成的时间状语, 谓语通常用现在完成时。)

935. It is true that quite a large amount of work, involving quite a high degree of skill, can be carried out by intelligent person, trained to use certain apparatus and perform certain operations,

but this is very different from knowledge of the subject as a branch of engineering science.

诚然，在使用某种仪器和进行某些操作方面，训练有素的巧手要付出大量需要高度技巧的劳动，但这与工程科学的这一分支学科的知识完全是两回事。（分词短语 *involving...skill* 和 *trained...operations* 都是非限定性定语，分别修饰 *work* 和 *persons*。）

936. An industrial demand has arisen for entirely new metals which were merely laboratory curiosities a few years ago, or which, in the case of the transuranic elements produced by nuclear fission, never before existed within the history of Man.

在工业上产生了对某些全新金属的需求，而几年前，这类金属还只是实验室里的珍品，或者说，就核裂变所产生的铀等元素而言，这类金属在人类历史上还从来未曾有过。（两个 *which* 引导的定语从句都是修饰 *new metals*，在从句中做主语。）

937. Australia is a sprawl of rock and desert, fringed with lush valleys, snow field, coral spectaculars, storm stabbed cliffs and rolling beaches, a land rich in minerals, colours, curious flora, 230 species of mammals, 700 of birds, 400 reptiles, 70 amphibia, 2 200 of fish and 50 000 species of insects – and seemingly infinite space.

澳大利亚的内陆到处是岩石和沙漠，但周边也有青草茂密的山谷，白雪覆盖着的大地、蔚为壮观的珊瑚礁、暴风骤雨侵蚀的悬崖绝壁和浪花滚滚的海滩，千姿百态的景色和争奇斗艳的花草。这片大地上有 230 种哺乳动物、700 种鸟类、400 种爬行动物、2 200 种鱼类和 50 000 种昆虫。澳大利亚似乎是无边无际、广漠无垠的大地。（该句是简单句，可简化为：*Australia is a sprawl of rock, a land and seemingly infinite space.* *a land* 和 *space* 是 *Australia* 的同位语。句子被两个短语变得复杂了。其一，*fringed with...beaches* 过去分词短语作非限定性定语修饰 *rock* 和 *desert*。其二，*rich in...insects* 是形容词短语修饰 *a land*。数词与 *of* 连用表示“种类”，*2 200 of fish*，“两千二百种鱼类”。）

938. Remarkable progress had been made in the technique of drilling wells long before the earliest oil-wells. Towards the end of the eleventh century the Chinese had reached depths of 3 500 feet with very primitive equipment when searching for underground sources of brine.

远最早的油井出现之前，钻井技术就已取得了显著的进展。将近 11 世纪末，中国人在探查盐水资源时，用非常原始的设备就已经达到了 3 500 英尺的深度。（*had been made* 是过去完成时被动态，它所表示的行为发生在“最早的油井”之前，所以 *make* 要用过去完成时。

had reached 是过去完成时态，它的行为发生的时间是在“11世纪末”之前，所以 reach 要用过去完成时态。)

939. Electricity enables us to obtain the advantage of water power – its cheapness – without its disadvantage; for the electricity may be generated up in the mountains, where there are waterfalls or swiftly flowing streams, and the electricity may be brought along wires to the factories located at the port.

电使我们能得到水力的优点——廉价，同时能避免它的缺点；因为可以在山上有瀑布或急流的地方发电，然后通过电线把电输送到港口附近的工厂去。(its cheapness 是 advantage 的同位语。)

940. The important lesson to be learned from these simple examples is that, given a certain substance, it can be transformed into many different derivative substances depending upon the types of microbes to which it is exposed, and upon the particular conditions under which microbial action takes place.

从这些简单的例证中要学到的教益是：给定一种物质，根据其所接触的微生物类型，以及发生微生物作用时的独特条件，该物质可以转化为许多不同的衍生物。(分词短语 given...substance 作状语有条件意味。)

941. The atoms of a given element consist of an assembly of an equal number of positive and negative portions of what we are pleased to call electricity, the former being commonly designated as protons, and the latter as electrons.

一定元素的原子是由一组数量相等的正负两部分带电粒子组成的，通常称带正电的粒子为质子，称带负电的粒子为电子。(the former being...designated as... 是分词独立结构，对句子作补充说明。the former 指 positive portions, the latter 指 negative portions。)

942. Similarly, the luminous road markers that protect our highways are cut in such a way that the light from the headlights of oncoming automobiles is reflected back and forth inside the transparent material of the markers and thus causes them to glow.

同样，保护公路的发光路标应加工得使迎面来的汽车的头灯发出的光能在路标的透明材料里来回反射，从而使路标发光。(第一个 that 引出定语从句，第二个 that 与 in such a way 呼

应，引出结果状语从句。)

943. On the earth's surface, only about three quarters of the light comes directly from the sun – the remainder, diffused by the atmosphere, strikes into the shadows to make visible those objects which are not directly reached by sunlight.

在地球表面，大约只有 3/4 的光直接来自太阳，其余的阳光被大气散射到阴影处，使人们能看见那些阳光不能直接照射到的物体。(visible 是宾语 those objects 的补足语，宾语与其补足语倒置，使 objects 与其后的定语从句靠近。)

944. A sound made by tapping on the hull of a ship will be reflected from the sea bottom, and by measuring the time interval between the taps and the receipt of the echoes the depth of the sea at that point can be calculated. So was born the echo-sounding apparatus, now in general use in ships.

敲击船帮所发出的声音会从海底传回来，测出敲击船帮与接收到回声的时间间隔，便可计算出该处的海洋深度。目前船只广泛使用的回声探测仪就是根据这个原理诞生的。(so 开头的句子通常要倒装。the...apparatus 是主语，谓语是 was born。)

945. It is significant that despite the rapid advance of science since the seventeenth century, it made no impact on the problems of prediction until the advent of the computer, and it is only thanks to the powerful new computers that worthwhile prediction in human affairs has been possible at all.

意味深长的是，虽然自 17 世纪以来科学发展迅速，但是在计算机问世以前，科学在预测问题上并没产生多大影响，只是由于有了强大的新型计算机，才有可能真正对人类事务做出有价值的预测。(it 是形式主语代替 that 引导的主语从句。介词短语 despite...century 作让步状语。it made...，这里 it 代替 science。it is only thanks to...that... 是强调句型，强调原因状语。only thanks to...at all 通常用于否定句，用于肯定句则起强调作用，可译为“到底”，“真的”，“竟然”“真正”等。)

946. There is another mode of reasoning, which does not say: "This statement is correct and its opposite is completely false", but which says: "There are various alternative possibilities. No one of these is certainly correct and true, and no one certainly incorrect and false."

还有另一种推理模式，它不说“这个论点是正确的，与此相反的论点则是完全错误的”；而是说：“存在各种可供选择的可能性，没有一个一定是正确的、真实的，也没有一个一定是

错误的、假的”。(句中两个 which 引导的都是非限定性定语从句, 先行词为 mode of reasoning。)

947. The progress of science depends upon many factors, and not least among these is the existence of satisfactory arrangements for the rapid exchange of new ideas and experimental results between research workers having similar interests.

科学的进步取决于很多因素, 其中重要因素之一, 就是在具有相同兴趣的研究人员之间, 对迅速交流新思想和实验成果的工作做出令人满意的安排。(这是一个由 and 连接的并列复合句。第二句是倒装结构, 主语 the existence 的说明语很长, 一直到句末。谓语是 is not least, 其后省略了 factor。为了避免头重脚轻, 用了倒装语序。分词短语 having...interests 作定语, 修饰 workers。)

948. Pasteur discovered that each type of microbe is more or less specialized in a few chemical reactions; and for every kind of organic substance there exists in nature at least one and usually several kinds of microbes capable of attacking and breaking down this substance provided the conditions are right.

巴斯德发现, 每种微生物在一些化学反应中或多或少都能显示其特性; 对每一种有机物来说, 事实上至少存在有一种、通常有好几种微生物, 如果条件合适, 这些微生物能侵袭或分解这种有机物。(在 there exist 的句型中, 主语 one 和 several kinds of... 是复数, 但谓语 exist 后加了“s”是因为应与谓语靠近的主语 one 取得一致。)

949. Chemistry is concerned mainly with matter, its properties, its composition, and the changes that it undergoes; also with the cause that produces changes in the composition of matter and the loss or gain of energy that accompanies changes.

化学主要研究物质, 研究物质的性质、成分及其所经受的变化; 也研究物质成分发生变化的原因, 以及伴随着化学变化的能量的得与失。(并列宾语 matter, its properties, ……之间用逗号。the changes 与 the cause 这两个并列宾语各带有定语从句, 并且前面同等成分之间已有逗号, 所以在 also with 之前用分号。)

950. The three most important effects of an electric current are heating, magnetic, and chemical effects, these being manifested when electrical energy is actively being converted into heat ener-

gy, magnetic energy, or chemical energy respectively.

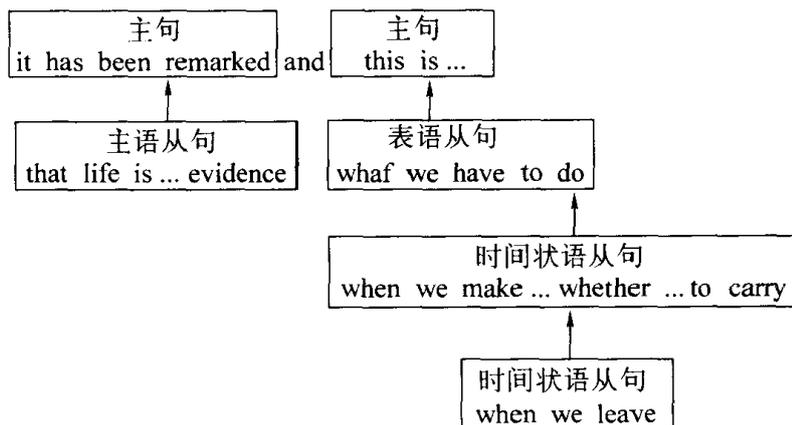
电流的三个最重要的效应是热效应、磁效应和化学效应，当电能分别有效地转变为热能、电磁能或化学能时，电流的这些效应就一目了然。(these being...respectively 是分词独立结构，在句中作补充说明。these 是代词，代替 effects。)

951. Some of the theories of science almost amount to certainties others are very conjectural, but it is always open to us to inspect the evidence and to find out whether the answer that science gives to a question is almost certain, highly conjectural, or somewhere in between.

有一些科学理论基本上确切的，而另一些理论则完全是推测性的，因而就值得我们去验证这些科学理论的论据，并查明科学理论对某一问题的解答是否近乎确切，是否纯属推测，或者介乎两者之间。(amount to, “等于”，“相当于”，“就是”。be open to, “值得”，“易受到”。不定式短语 to inspect... 和 to find... 作主语，it 是形式主语。whether 引出宾语从句，该从句的主语是 answer，谓语由 is 加上三个并列表语 certain, conjectural, or somewhere 组成。在主谓之间插入由 that 引出的定语从句，修饰 answer。in between, “位于其间”，这里 between 是名词。)

952. However, it has been remarked that life is an almost continuous experience of having to draw conclusions from insufficient evidence, and this is what we have to do when we make the trivial decision as to whether or not to carry an umbrella when we leave home for work.

人们已注意到生活过程几乎是一个必须从不充分的证据中得出结论的连续历程，这就是当我们对日常琐事做出决定时而不得不做的事情，譬如：当我们离家上班时，是否带雨伞就是这样。(it 为形式主语，代替 that 引导的主语从句。draw conclusions, “得出结论”。make decision, “做出决定”。本句是并列主从复合句，图解如下：



953. As we shall see when we come to study radioactivity, one of the results of the automatic breaking down of the atomic structure in such elements as radium is the production of what are known as gamma rays, which are waves having a length of about one tenth that of X-rays.

正如我们将要了解的那样，当我们开始研究放射性时，镭这样一些元素的原子结构自动裂变的结果之一，就是产生所谓伽马射线，其波长大约是 X 射线的 1/10。(As 是关系代词，引出定语从句。as 代替后面全句内容，在从句中作 see 的宾语。come + 不定式有“开始……”之意。主句中 one of... 是主语，谓语是 is the production。what 引导的从句作介词 of 的宾语，of what... 作 production 的定语。分词短语 having... 作定语，修饰 waves。)

954. Bringing more water to the land, improving the soil, providing plant nutrients, teaching the farmer better cultural practices, giving him more efficient tools, etc. , cannot yield maximum results unless the plants under cultivation are able to respond fully to the improved environment and practices.

除非使农作物完全适应改善的环境和各项农业技术，否则给土地提供更多的水、改良土壤、给植物提供养料、教会农民先进的耕种方法并给他们提供更有效的生产工具等等措施就不能产生最大的效果。(主句中有五个动名词短语作主语：Bringing..., improving the soil, providing... nutrients, teaching... practices, giving... tools, 谓语是 cannot yield。)

955. The fact that electrons move in the body of the metal and pass from one metal into another, that electric forces direct their movement, and that electrons may leave the bound of the metal leads to the conclusion that electrons move freely among the atoms of a metal just as gas molecules do in the air.

电子在金属体中运动并能从一个金属体流到另一个金属体，电子的运动是受电动势控制的，电子可以脱离金属的束缚，所有这些事实可以导出一个结论，即电子在金属的原子中间自由地运动着，就像气体分子在空气中自由运动一样。(主句是 The fact leads to the conclusion。fact 带有由 that 引出的三个同位语从句，conclusion 也带有 that 引出的同位语从句，该句中又有一个 just as 引出的方式方法状语从句。)

956. No distinction between technology and science can indeed be made in terms of subject-matter, training of personal, or terminology; nor, as things are, could the actual study of science easily be separated from technology, on which it has come to depend rather intimately for materials

and apparatus.

不能根据研究的课题、人员的训练或科学术语把生产技术与科学真正区分开，就目前情况来看，实际的科学研究也很难与生产技术分开，因为从根本上说科学是依靠技术而获得材料和仪器的。（第一句由否定主语转移否定状语。nor 用在 not, no, never 等词的后面，表示否定句的连续，nor 连接的句子，一般用倒装语序。主语是 the study, 谓语是 could be separated. as things are, “就目前情况来看”，用作插入句。which 引导的定语从句有原因的意味。）

957. It was not until 1897, when professor J. J. Thomson discovered the basic sub-atomic particle of negative electricity called the electron, that it became evident that Franklin's first guess was wrong and that it was negative rather than positive charge that was transferred during electrification.

直到 1897 年 J. J. 汤姆森教授发现了带负电的亚原子基本粒子（称为电子）时，人们才明白了富兰克林的第一个假设是错误的，还弄清了带电时传导的是负电荷而不是正电荷。（第一句 it was not until...that... 和末句 it was negative...that... 都是强调句型。rather than, “而不是”。）

958. Boyle's law that the density of a gas is proportional to its pressure, and Charles' law that the volume is proportional to the temperature, would be exact if gas molecules were points which had no volume and did not attract one another.

如果气体的分子是既没有体积也不相互吸引的质点，那么波义耳定律——气体的密度与其压力成正比和查理定律——体积与温度成正比就是精确的。（主句中有两个并列主语：Boyle's law and Charles' law, 谓语是 would be exact; 两个主语各带一个 that 引导的同位语从句。if 引导条件状语从句。）

959. Whereas in the industrialized world the focus is on air and water pollution, the energy shortage and chewing up of unspoiled land by urban sprawl, the concern of an African or an Asian will most likely center on hunger and malnutrition, health, the desiccation of the soil, the insufficiency of water, the lack of education and jobs.

在工业化的国家里主要关注的问题是：空气和水源的污染、能源的缺乏、城市的扩展蚕食了没有毁坏的土地。非洲人或亚洲人最关注的问题集中在：饥饿、营养不良、保健、土壤干旱、缺水，缺乏教育和就业等问题。

(whereas, “而”, 表示对比关系。通常它位于第二个分句的句首, 如: some praise him, whereas others condemn him. 一些人称赞他, 而另一些人却责难他。chewing up, “蚕食”。center on, “集中于, 寄托于……”。)

960. It must be made as easy as possible for the research and development personal to be kept aware of the state of general world knowledge on a particular subject, so as not to be led by ignorance into expensive researches to find out what is already well known.

必须让研究和开发人员更好地了解世界上有关(你所研究的)某一特定课题的一般动态, 以免由于闭塞无知而耗费大量的经费去研究人们早已知道的认识。(so as + 不定式的结构中, 不定式是否定形式时通常译成“以免”, “不致”。)

961. Combining several instruments of the conventional type in one, universal measuring microscope is a truly universal and indispensable aid in solving measuring problems with utmost precision, dependability, efficiency, and, last but not least, economy.

由于万能工具显微镜把通常类型的几种仪器的功能综合为一体, 所以它确实是一种多用途的、不可缺少的工具, 借助它解决测量问题, 具有下列特点: 精度高, 可靠, 效率高而且经济——经济排在最后, 但并非不重要。(本句是简单句, 其中有三个短语, 即: 分词短语 combining...in one 作原因状语; 介词短语 in solving...problems 是状语, 表示处所; 介词短语 with...economy 作方式方法状语, 说明动名词 solving。)

962. Because basic research is aimed at understanding rather than at practical results, the layman sometimes assumes that it is entirely abstract and theoretical, and that only when it becomes a matter of industrial development does it “come down to earth”.

因为基础研究的目的在于认识客观世界, 而不是实际结果, 因而外行人有时认为基础研究是完全抽象的、理论上的, 同时认为, 只有当这种研究变成工业发展的现实, 它才有实际的价值。(句中有三个 it, 都代替 basic research。only when 位于从句的句首, 它的主句主谓语应倒装, it 是主语, 谓语是 does come down。)

963. Further evidence of the immense part that microorganisms play in the world of nature is found in the fact that, according to recent calculations, the total mass of microbial life on earth is approximately twenty times greater than the total mass of animal life!

根据目前的统计，地球上微生物的总数大约为动物总数的 20 倍，这一事实进一步证明了微生物在自然界中所起的巨大作用。(that 引导定语从句，它是 play 的宾语。play a part “起作用”。主句中 evidence 为主语，谓语是 is found。that 引导同位语从句用来揭示 fact 的内涵。)

964. Science is just knowledge and has no national content, but Karl Porper, a philosopher who has given much thought to the methods of science and their application to society, has shown that science can make of least a modern contribution by guiding people in taking a scientific attitude to political problems.

科学仅是知识，它没有国界。但是，卡尔·波普——一位曾对科学方法及其在社会中的应用做过深入研究的哲学家——阐明：科学至少可以指导人们对政治问题采取科学的态度来发挥它的作用。(Karl Porper 是主语，谓语是 has shown。make a contribution to..., 对……做出贡献。take an attitude to..., 采取态度。)

965. Not until we have detailed studies of the present movement of traffic and have a clearer idea of how many people wish to travel, where they want to go, at what time of day and how quickly – not until then can we begin to plan a proper transport system for the future.

直到我们详细地研究了当前的交通状况，比较清楚地了解了有多少人想去旅行，要到哪里去，在一天中什么时候去，想多快去——直到那时，我们才能开始对未来的运输系统进行适当的规划。(not until then can we..., 句中主语是 we, 谓语是 can begin。)

966. It is because the author has succeeded in interpreting the development and technical characteristics of electricity in a way many readers may easily understand, that his book is especially valuable, both to intelligent layman and those in the engineering profession.

正是因为作者能以许多读者明白易懂的方式成功地阐明电的产生及其技术特征，所以他的书不仅对聪明的外行人，而且对专业技术人员都是很有益的。(it is...that (第二个 that) ... 为强调句型，强调原因状语从句 because the author...understand。many readers...understand 是省略 in which 的定语从句。valuable to, “对……很重要”，“对……很有价值”。)

967. As well as its thousands of millions of stars, the Galaxy contains a great deal of thinly-spread interstellar matter. Tenuous though it is, this matter covers so wide an area that its total mass is probably equal to the combined mass of all the stars.

除了千百亿颗恒星以外，银河系还包括无数稀疏的星际物质。尽管这些物质是稀薄的，但它们却覆盖了很大的范围，因而这些星际物质的总质量可能等于所有恒星质量的总和。(as well as..., “除了……以外”。though 引导的让步状语从句是倒装语句，it 是主语，谓语是 is tenuous。与 so 相呼应，that 引出结果状语从句。)

968. It should be said, however, that this process of internationalization of science has been going on already for a long time in a hidden form, and what we realize today is simply the necessity of a better and more systematic institutionalization of an old process.

但应该说明的是，长期以来，科学的国际化进程一直在以隐蔽的形式进行着，而今天我们所认识到的就是有必要使原有的这一过程制度化，使之更加完善，更有秩序。(what 引导的是主语从句，what 在从句中是 realize 的宾语。)

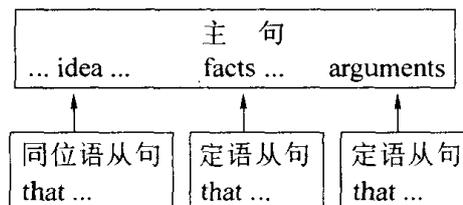
969. However, despite a dramatic call from environmentalists for radical changes in the way cars are designed and built, a survey of international car manufacturers by a British research company foresees a continuation of current trends — a move towards more efficient petrol-engined cars, a slight upswing in the use of diesel cars, and a gradual move to electric and gas-powered cars.

然而，尽管环境保护主义者强烈呼吁彻底改变汽车的设计与制造方法，据英国一家研究公司对国际汽车制造厂的调查表明，目前这种趋势仍在继续发展，即发展高效率的汽油引擎的汽车、少量增加柴油汽车的使用，逐步向电动和燃气汽车过渡。(despite...built 是介词短语，作让步状语。本句为简单句，主语是 a survey，谓语是 foresees。of 和 by 两个介词引导的介词短语作定语，均修饰 survey。破折号——引出的三个同位语：a move..., a slight upswing...and a...move 用来对 a continuation of current trends 补充说明。)

970. By the atomic theory we mean not only the idea that substances are composed of atoms, but also all the facts about substances that can be explained and interpreted in terms of atoms, and the arguments that have been developed to explain the properties of substances in terms of their atomic structure.

所谓原子学说，不仅是指物质由原子所组成这一概念，而且泛指可以由原子的观点来解释和描述的有关物质的一切事实，以及根据物质的原子结构来说明物质的性质而发展起来的各种理论。(by...we mean..., “所谓……我们指的是……”。谓语 mean 带有三个并列宾语：idea,

facts 和 arguments, 而这三个宾语各带有从句作进一步说明。) 图解如下:



971. A particularly important application of a computer in simplified form is as a component in the control equipment of manufacturing processes – as the nerve centre which accumulates and analyses data recording the operating conditions and performances of the plant, and sends out instructions, when appropriate, for their modification.

简化形式计算机的一个特殊重要用途, 是作为生产流程控制设备的一个组成部分, 即作为该设备的神经中枢, 对记录的工厂运转和执行情况的数据进行存储和分析, 然后发出指令, 适当的时候还对指令加以修正。(when 后省略了 it is。)

972. And while today it is true that people do not fight and each other in the street—while, that is to say, we have got to the stage of keeping the rules and behaving properly to each other in daily life—nations and countries have not learnt to do this yet, and still behave like savages.

诚然, 尽管今天人们在街上不再打斗——这也就是说, 尽管我们在日常生活中已达到奉公守法、彬彬有礼的思想境界——然而民族与国家还没有学到这一点, 他们的行为仍然像野蛮人一样。(句中有两个 while 引出的句子都是让步状语从句。nations...savages 为主句。keeping...and behaving... 两个动名词短语做 of 的宾语。)

973. The story of the discovery of what is now generally called the principle of Archimedes, namely that a solid body when immersed in a liquid loses a portion of its weight of the liquid it displaces, has many different versions, of which the following is one.

当固体浸没到液体中时, 固体会失去它所排出的液体的那部分重量, 这就是现在通常所谓的阿基米德原理。有关这一发现的故事很多, 下面的故事就是其中之一。(主句中主语是 story, 谓语是 has, 中间被 what 引出的宾语从句和 that 引导的同位语从句隔开了, 在同位语从句中, 又包含一个时间从句和省略了关联词的定语从句 it displaces。)

974. The construction of such satellites has now been realized, its realization being supported

with all the achievements of modern science, which have brought into being not only new materials capable of with-standing strong stresses involved and high temperatures developed, but new technological processes as well.

现在已经制成了这样的卫星，它的实现得到了现代科学所有成就的支援，这些成就不仅提供了能经受强应力和耐高温的材料，而且也提供了新的工艺规程。（its realization being supported... 是分词独立结构，起补充说明作用。bring...into being, “实现”，“使……出现”。materials 是 have brought 的宾语。capable of...as well 是形容词短语，用来说明 materials。as well, “同样”，“也”。）

975. To cope with civilian needs for more convenience in home living and in order to meet the needs raised by growing diversification of lifestyles, active research is presently in progress to develop and commercialize new media incorporating data processing functions for use in addition to existing media involving the television, radio and telephone.

为了适应居民生活更加方便的需要并满足日益增长的生活方式多样化的要求，除电视、无线电、电话等媒介外，目前正在积极开发具备数据处理功能的新媒介并使之商品化，以供人们享用。（To cope with... 和 in order to... 两个不定式短语均做目的状语。research 是句中主语，谓语是 is...to develop...and commercialize, be + to do 有“将来”之意。in progress, 在进行中，在发展中，做状语，修饰 to develop。raised...lifestyle, incorporating...use, involving...telephone 三个分词短语都用做定语，分别用来修饰 needs, new media 和 existing media。本句为简单句。）

976. Considering the continued advances in modern industrial production toward greater precision and more reliable function of its products, it is obvious that such pragmatic goal will not detract from the high degree of professional knowledge which dimensional measurements for production purposes often require.

考虑到现代工业生产朝着产品更为精密、功能更为可靠的方向取得了不断进展，显然，这种实用目的不会降低对高水平专业知识的要求，这种专门知识正是为了进行生产而测量产品尺寸所经常需要的。（分词短语 Considering...products 作状语，有条件意味，其中介词短语 in... 和 toward... 均说明 advances。that 引出主语从句。which 引导定语从句，它在从句中是 require 的宾语。）

977. It is only during the last few thousand years that man has known anything about coal, between 1000 - 2000 years since it achieved any degree of commercial importance, and only about 100 years since it became an almost indispensable factor in national and industrial economics.

仅在最近几千年中，人类对煤才有所认识，在近一千到两千年间，煤在商业中得到某种程度的重视。而仅在大约 100 年里，煤却在国民经济和工业中成为一个几乎不可缺少的因素。（It is...that... 为强调句型，强调由介词 during 引出的时间状语。）

978. The external circumstances of our daily lives are almost wholly dependent upon science and there is scarcely anything in the modern home that has not been made by processes whose principles involve the scientific advances of recent years.

我们日常生活的周围环境差不多完全离不开科学，几乎没有一件现代家庭用品不是根据与近年来科学进展有关的工艺原理而制造出来的。（scarcely, “几乎没有”。that 引导定语从句，修饰 anything。whose 引出定语从句，修饰 processes。）

979. The heat energy of steam may be transformed into mechanical energy by a steam engine and given a dynamo, which does work against electric and magnetic forces, producing some heat but largely electric potential energy, which in turn is changed, by the flow of an electric current, partly into heat in the wire, but largely into mechanical work by a motor, or into light and heat by an electric lamp.

用蒸汽机可把蒸汽的热能转变成机械能再输送给直流发电机。发电机克服电磁力而做功，结果产生一点热能，但主要产生电势能。借助于电流，这种电势能又在导线中部分地变为热，但主要是通过马达变换为机械能，或由电灯变为光和热。（which does work... 是非限定性定语从句；分词短语 producing...energy 用作结果状语；which in turn... 直到句末是非限定性定语从句，修饰 potential energy；by the flow of an electric current 是插在句中的方式状语；partly into... 与 largely into... 是并列成分，以上这些地方都用了逗号与其他成分隔开。）

980. The development of rockets has made possible the achievement of speeds of several thousand miles per hour; and what is more important it has brought within reach of these rockets heights far beyond those which can be reached by aeroplanes, and where there is little or no air resistance, and so it is much easier both to obtain and to maintain such speed.

火箭技术的进展已使速度可达每小时几千英里，而更为重要的是，这种进展已使火箭所能

达到的高度大大超过了飞机所能达到的高度，在这样的高度上，几乎没有或根本没有空气阻力，因而很容易达到并保持火箭的那种高速度。（第一句 has made 的宾语很长，所以放在宾语补足语 possible 后面。what is more important, “更为重要的是”，作插入句。第二句中 it 代替 development。介词短语 within reach of these rockets, “在火箭所能达到的高度范围内”，作状语，说明谓语 has brought。heights 是 brought 的宾语，far beyond those 是形容词短语，修饰 heights, those 代替 heights。where 引出定语从句，修饰 heights。）

981. But I believe that all students of mechanics, no matter what their aims and intentions may be, will be in the same position in one respect, namely that they will best begin the study of the subject by trying to acquire a firm grasp of the physical principles, leaving aside at first all mathematical developments and all practical applications, except in so far as these contribute to the elucidation of the fundamental physical principles.

但是我认为，学习力学的学生不论他们的学习目的和意图如何，有一点是共同的，即首先要把所有的数学推导及力学的实际应用放在一边，而尽力去牢固地掌握物理原理，才能一开始就学好这门课程，但是如果这些数学推导和实际应用有助于阐明基本物理原理，则另当别论。（宾语从句 that... 里主语 students 和谓语 will be 被让步状语从句 no matter what... 分隔开了。namely that..., that 引导的仍是 believe 要求的宾语从句。分词短语 leaving aside... 作状语，有条件意味，说明 to acquire。except in so far as, “除非”。）

982. As the century developed, the increasing magnitude and complexity of the problems to be solved and the growing interconnection of different disciplines made it impossible, in many cases, for the individual scientist to deal with the huge mass of new data, technique and equipment that were required for carrying out research accurately and efficiently.

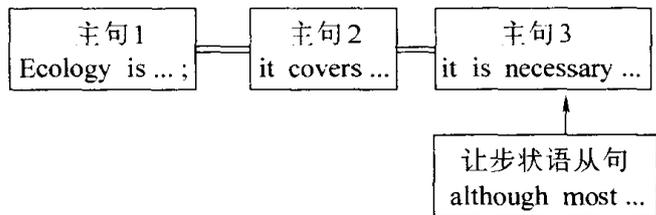
随着本世纪时间的推移，有待解决的问题和规模越来越大而且日益复杂，不同学科之间的联系也不断增强，这就在很多情况下使得科学家不可能独自处理为精确有效地从事科学研究所需要的大量新数据、新技术和新设备。（主句中主语为 magnitude, complexity 和 interconnection。谓语是 made, it 是形式宾语，impossible 是宾语补足语，真正的宾语是不定式短语 to deal with...efficiently。介词短语 for the...scientist 是不定式 to deal with 的逻辑主体。）

983. Ecology is not even primarily about man; indeed it covers all living organisms, and although most people will undoubtedly be interested in the implications of ecology for human life and

welfare, to understand the subject it is necessary to abandon an entirely man-oriented approach and to consider instead the inter-relationships of all life and the environment.

生态学甚至主要不是研究人类，实际上它包括了所有生物。尽管大多数人将无疑地对关系到国计民生的生态学本质感兴趣，但要了解这门学科就必须放弃纯粹与人类有关的研究，而应考虑一切生物与环境之间的内在联系。（本句是并列主从复合句。）

图解如下：



984. The idea that everything is made up of very small particles, or atoms, was known to the Greeks over two thousand years ago, but it was only about one hundred and fifty years ago that John Dalton put forward the important idea which made the atomic theory really useful and greatly hastened the development of modern chemistry.

希腊人在 2 000 多年以前就已经知道，一切物质都是由很小的微粒即原子构成的。但仅仅在大约 150 年以前，约翰·道尔顿把这一重要思想推向前进，使原子学说成为真正实用的理论，从而大大促进了现代化学的发展。（The idea that...，that 引导同位语从句；but it was...that... 为强调句型，强调时间状语 only about one...ago。which 引导定语从句修饰 idea。）

985. The same atoms turn up again and again, and the great variety of substances we find on earth result, not from any great variety of atoms entering into their composition, but from the great variety of ways in which a few types of atoms can be combined – just as in a colour-print three colours can be combined so as to form almost all the colours we meet in nature, not to mention other weird hues such as never were on land or sea.

同样的原子是反复出现的，我们在世界上所见到的物质之所以多种多样，并不是组成物质的原子也是多种多样的，而是由于为数不多的几种原子结合的方式是多种多样的，这就像彩色印刷中三基色就可以组合成我们在自然界中所见到的几乎所有的颜色，且不说那些在陆地和海洋中从未曾有过的光怪陆离的颜色了。（result from...，“由……引起，起因于”。not from...，but from... 这两个介词短语都是由 result 要求的。）

986. Maxwell produced, by brilliant mathematical reasoning, the theory that electro-magnetic disturbances, though invisible to our eyes, must exist in space, and that these waves travel at the same speed as the light waves – that is, at the rate of 186 000 miles, the equivalent of more than 7 times round the world, per second.

麦克斯韦通过卓越的数学推理提出了一个理论，即虽然我们的眼睛看不见电磁干扰，但空间里肯定存在着电磁干扰；这些电磁波的速度与光波的速度一样，即每秒达 186 000 英里，相当于每秒绕地球七圈多。（though 后省去了 they are, they 指 electro-magnetic disturbances。）

987. We are saying that there are some things the physicist and historian do that are similar, similar enough so that each can develop some appreciation and respect for the work of the other, and the person who is neither can appreciate and understand the common features of the work of both.

我们是在说，物理学家和历史学家所做的事情有些是相似的，相似得他们会对彼此的工作相互赏识、相互尊重，而局外人也能够赏识和理解他们工作中的共同的特点。（the physicist and historian do 是省略 that 的定语从句，修饰 things。that are similar 是定语从句修饰 things。so that 引导结果状语从句。who is neither, 既不是物理学家也不是历史学家，即局外人。）

988. Finally, meteorological satellites have become powerful tools in the hands of atmospheric scientists for acquiring, on a truly global basis, a variety of measurements fundamental to an understanding of air motion and to the exchange of energy between the sun and earth which is responsible for such motion.

最后，气象卫星在大气科学家手中已成为强有力的手段，他们借助于气象卫星，真正在全球范围内获得各种测量数据，而这些测量数据对理解空气运动以及太阳和地球之间的能量交换都是极为重要的。空气的运动就是这种能量交换而引起的。（fundamental... 直到句末是形容词短语，修饰 measurements。）

989. Yet it must be remembered that frequently certain pieces of fundamental knowledge needed for the solution of a practical problem may be totally lacking and may be acquired before further progress on the practical problem can be achieved; thus what is commonly called applied research often involves some basic research.

然而必须记住，经常缺乏解决实际问题所需的某些知识，而必须获得这些知识才能使这个实际问题的解决取得进展。因此，通常所说的应用研究常包含某些基础理论研究。（needed

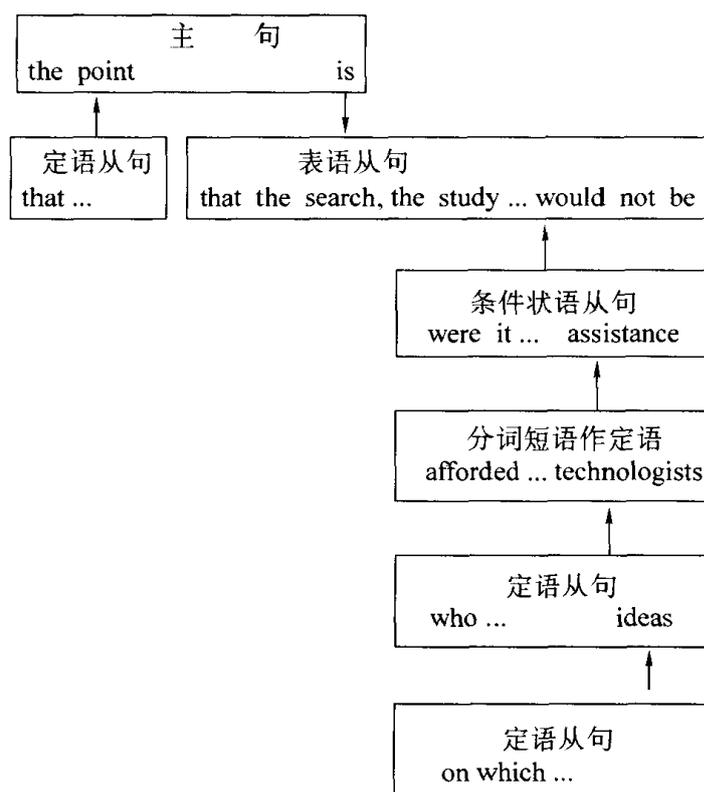
for...problem 过去分词短语作定语修饰 pieces of...knowledge。what 引导主语从句，谓语是 involves。)

990. Furthermore, it should be borne in mind that apparently minor changes in laboratory conditions, such as variations in the electric current, or failure to maintain atmospheric conditions constant, may disturb the accuracy of various items of equipment and hence have an adverse influence on the experiment or series of experiments as a whole.

此外应该记住，在实验室条件下，表面看来是微小的变化，例如电流的不稳定，或者不能保持大气条件稳定，都可能影响设备各部分的精度，从而会对某一实验或整个一系列实验产生有害的影响。(that 引导主语从句，从句中主语是 changes，谓语有两个 may disturb 和 have。)

991. The point that I am anxious to make is that the search for models of this kind, the study of their behaviour and of the relationship of this behaviour to the real situations which they seek to represent, and the consequential modification of them so as to lead to reliable prediction and then to decision-taking, would not be possible were it not for the assistance afforded to the investigator by computers – and by the work of the technologists who have successfully transformed the scientific ideas on which it is founded into stable, reliable and economic pieces of electrical equipment.

我急于指出的一点是：探索这类模型，研究这类模型的特性，研究此特性与模型所表示的真实情况的关系，以及随后修正这类模型以便得出可靠的预测继而得出决策，如果没有计算机对研究者所提供的帮助，上述的探索和研究是不可能的；技术人员已成功地把上述科学思想转变成稳定、可靠、经济的电子设备，如果没有技术人员的这种工作，上述的探索和研究同样也是不可能的。(本句是由 that 引导的表语从句展开的。该从句中有三个并列主语：the search, the study 和 the modification，第二个和第三个主语被 which 引出的定语从句分隔开了。谓语是 would not be。so as to lead to...decision-taking 是 so as 引出的不定式短语，用来说明 modification 的目的。were it not for... 是省略了 if 的虚拟条件从句，等于 if it were not for..., “假如没有”。分词短语 afforded... 直到句末，用来修饰 assistance。...transformed the...ideas into... 被定语从句 on which it is founded 分隔开了。) 图解如下：



992. The third aspect is concerned with the group of new technologies which are not yet in general use, but are still under development, mainly in the technologically advanced countries. I refer, for instance, to such things as solar heats, fuel cells, desalination of water, and a great many improved processes and manufactured goods. Though a close watch must be kept on these developments, I am convinced that the national economic and technological planning of a new country's development, over the next decade or so, should be based on what is now known.

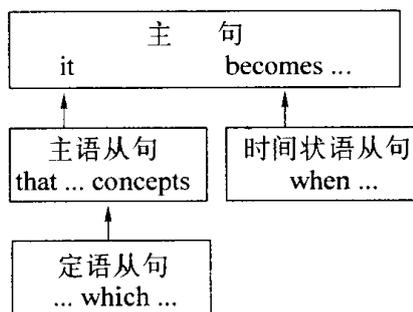
第三方面涉及到一些新技术问题，这些新技术在科技发达的国家还没有得到普遍应用，仍处于研制阶段。这些新技术我指的是诸如太阳能的利用、燃料电池、海水淡化以及其他很多新工艺和工业品等等。尽管对这些新技术要给予密切注视，但是我确信，一个新兴国家的国民经济和科技发展的规划在下一个十年左右，应建立在现有的发展水平上。（句中 these developments 不能简单地译为“发展”，因为前面有限定词 these，显然有所指，它用来替代 technologies。such things as... 用来揭示了 technologies 的具体内涵，所以句中三个词：technologies, things 和 developments 都是同一概念，都指的是“技术”。）

993. However, when the developments of the past few decades of chemical research are care-

fully considered, it becomes apparent that, in all areas of chemistry, there has been a strong trend toward the building of series of theoretical concepts in terms of which it is possible to correlate the result of manifold observations of our physical surroundings with a consistent and dependable picture of the submicroscopic structure of the material world.

然而，我们仔细地观察一下过去几十年中化学研究工作的发展情况就会明白，在化学的所有领域里，存在着一种建立一系列理论概念的强有力趋势，根据这些理论概念，我们就有可能把对自然环境各方面的观察结果与物质世界的一致而可靠的亚微观结构图像联系起来。(trend toward, “趋向于”。correlate...with..., “把……与……联系起来”。)

各句关系图解如下：



994. Reading will be a guide to experiment, and experiment will enable a proper appreciation of that which is read, to be made, and enable the young scientist to judge more accurately what must be accepted as an enlightening truth, and what must be viewed with scepticism.

阅读是实验的指南，而实验能使读者对所阅读的内容作出适当的评价，同时能使年轻的科学家较准确地判断出什么内容应作为启发性的真理而加以接受，对什么内容应持怀疑态度。(enable... + 不定式，“使……能够……”。不定式被动态 to be made 是 appreciation 的宾语补足语。宾语与其补足语被 which is read 分隔开了。)

995. Anyone can watch an apple fall and ruminate about a force of gravity. It took the genius of Newton to leap from there to the idea that it was the same force that caused the moon to drop from its natural motion in a straight line, to calculate at once the amount by which it dropped and from that to infer the inversesquare law; in short, to leap from terrestrial gravity to a simple and universal law of gravitation.

任何人都能看到苹果从树上掉下来，因而会想到引力。牛顿的天才在于由此产生了思想上的飞跃：正是这同一引力使月球偏离了它正常的直线运动，还在于他立即计算出月球偏离的

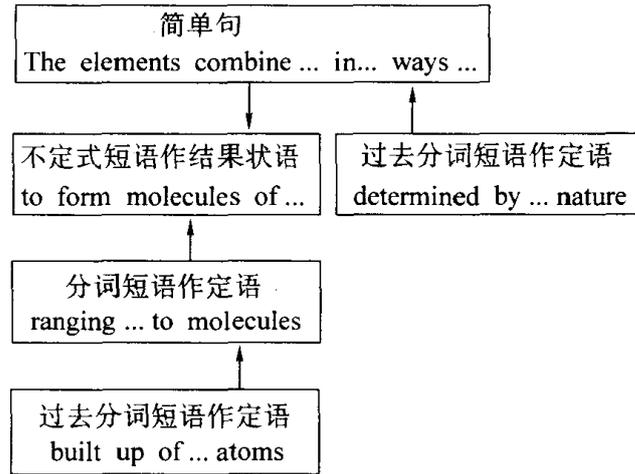
997. Delegates to this year's meeting of the International Whaling Commission in London late last month agreed to further reduce catch quotas for next season. The decision to adopt an Australian proposal for a ban on the hunting of species by category once their populations drop below set levels was reached after a heated debate between Japan and the Soviet Union, which account for some 80% of the total annual haul, and the US, which has been calling for a 10-year moratorium on whaling.

国际捕鲸委员会上月末在伦敦召开了一年一度的年会，与会代表同意再度降低下一季度的鲸鱼捕获量。日苏捕获量大约占全年鲸鱼总捕获量 80%，而美国却一直在呼吁十年暂停捕鲸，因而在日苏与美国之间展开了激烈的辩论，之后，委员会作出了决定，一致同意采纳澳大利亚的倡议：一旦鲸鱼的数量降到规定的限额以下，就要按鲸种的类别，禁止对该鲸种捕猎。（第二句是主从复合句，共有 4 句，一个主句，once 引导的条件状语从句和两个 which 引导的定语从句。主句中 decision 是主语，谓语是 was reached。between A and B。这里 A 是 Japan and the Soviet Union，B 是 US。set 是过去分词作定语修饰 level，意为规定的限额。has been calling for...，是现在完成进行时态，表示“一直在号召……”。）

998. The elements combine together in a practically unlimited number of ways, determined by their valencies and chemical nature, to form molecules of many grades of complexity, ranging from hydrogen molecules, H_2 , with two like atoms, to molecules built up of various kinds and numbers of atoms.

各种元素实际上是以无限多的方式互相结合在一起，从而形成各种复杂程度不等的分子——从只有两个相同原子的氢分子 H_2 到由不同种类、不同数目的原子组成的各种分子——而元素的不同结合方式是由元素的原子价和化学性质所决定的。（分词短语 determined by...nature 作定语，修饰 a...number of ways。不定式短语 to form molecules... 是 combine... 的结果状语，被介词短语 in...ways 和分词短语 determined by... 分隔开了。range from...to..., “从……到……的范围”，“分布在……范围内”。ranging from...atoms 是现在分词短语作定语，用来修饰 molecules of many grades。build up of..., “由……组成”。built up of... 是过去分词短语作定语，用来修饰 molecules。）

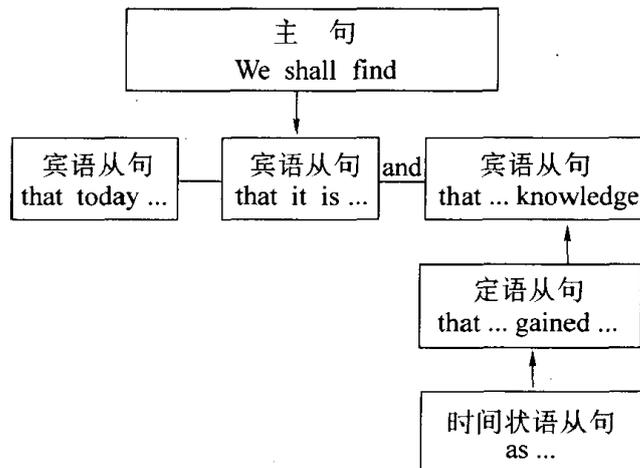
简单句中词与词之间关系图解如下：



999. We shall find that today chemistry is a science made up of a great variety of experimental knowledge well organized with the assistance of many laws and theories; that it is being added to in constantly expanding fields by workers in scientific laboratories and industrial plants; and that no limit can be imagined to the additional knowledge that will be gained as the years pass.

我们将会发现，近代化学是由经过许多定律和理论很好组织起来的大量实验知识构成的一门学科，同时我们还可发现，科研实验室和工厂里的工作人员在日益发展的各个领域里还在不断地丰富着这个学科的内容，因此，随着时间的推移，所积累起来的知识很难设想会有一个界限。

各句关系图解如下：



1000. The results of many experiments on systems which change their mechanical states when they are placed together and finally reach thermal equilibrium lead us to infer that all ordinary ob-

jects have a new physical property that determines whether they will be in thermal equilibrium when they are placed in contact with other objects. This property is called temperature.

当两个以上的系统放在一起时，它们的力学状态就要改变，并最终达到热平衡。对这样的系统进行了多次试验，其结果使我们得出推论：一切普通物体都具有一种新的物理特性，当它们与别的物体接触时，这种特性决定了它们是否处于热平衡状态。这种特性称为温度。（本句有一个主句、六个从句。难点在于有两个分离现象：一是主句的主谓语 The results...lead... 被 which 引导的定语从句分隔开了；二是 which 引导的定语从句中两个同等谓语被条件状语从句分隔开了。）

各句关系图解如下：

