

1. Ultrasonic Waves in Liquids

液体中的超声波

Today, ultrasonic waves are being put^① to work in laboratories and factories. If an ultrasound generator is placed in a liquid, the waves move the liquid back and forth hundreds of thousands of times each second. This causes materials to mix quickly or to dissolve in liquids. Paint manufacturers use ultrasound to do a better job of^② blending^③ colors. The companies that make film for your camera find that mixing chemicals by the use of sound waves will produce a more sensitive film.

目前，超声波正在实验室和工厂中获得应用。如果将一台超声发生器置于液体中，那么声波就会使液体每秒钟来回运动数十万次，从而使材料迅速搅拌或溶解于液体。油漆制造商利用超声能更充分地调和颜料。生产照相机胶卷的各公司则发现利用声波来搅拌化学剂能生产出感光性更好的胶卷。

① put : 把……用于。此处系现在进行词的被动形式。

② do

a better job of; 把.....做得更好。

③ blend: 此处意为 mix thoroughly(彻底地混和)

The new lightweight type of washing machine uses ultrasonic waves to get clothes clean. Its special ultrasound generator^① is put into a pail of soapy water containing the soiled clothes. The sound waves drive the soapy water back and forth through the cloth so fast that everything is soon clean. There is also a new kind of dishwasher that works in much the same way^②.

新式的轻型洗衣机利用超声波将衣服洗净。将特制的超声发生器安装在专放脏衣服的肥皂水桶内。声波疾速地来回搅动肥皂水，使之穿过布料，于是一切都很快洗净。还有一种新式的洗碟机，其工作方式亦大致相同。

① ultrasound generator: 超声发生器，亦写做 ultrasonic generator。 ② in much the same way 以大致相同的方式 此处的much 等于about。

Ultrasonic waves can shake a liquid so fast that tiny holes form all through it. The liquid is actually torn apart by this action. Almost as soon as these holes are made, they

fall together again. The result is a powerful pounding action. In the dairy industry^① this is used for the double purpose of making homogenized milk and sterilizing it at the same time. If you look at some raw milk with a microscope, you find that it is made up of little drops of butter fat floating around in a watery liquid^②, In order to make milk easier to digest, these fat droplets may be broken up by forcing the milk through very small openings. The result is called homogenized milk. When the ultrasonic method is used, the sound waves not only break up the droplets but also kill the germs in the milk by pounding them to pieces.

超声波能极快地搅动液体，使之全部产生细小的空腔，这样，液体实际上是被打散了。这些空腔几乎一经形成，就又结合在一起。结果则产生了猛烈的撞击作用。在乳制品业中这一方法用于生产均脂牛奶，同时又对其进行消毒这样一个双重目的。假若您用显微镜观察一下一些未经加工的牛奶，就会发现它是由漂浮在水样液体中的乳脂小滴所组成。为了使牛奶易于消化，可将牛奶强行挤过非常细小的空隙，使这些乳脂微滴分解，这样产生出来的便称之为均脂牛奶。采用超声方法时，声波不仅分解了乳脂微滴，而且也将细菌撞得粉碎，杀死了奶中

的细菌。

①dairy industry : 生产牛奶、黄油及乳酪的行业。 ②floating
around in a watery liquid 系现在分词短语，作为 little drops of
butter fat 的定语。

2. Uses of Ultrasounds

超声的用途

In a machine shop^① ultrasound can be used for cutting and drilling hard materials. The tool is a shaped piece of metal attached directly to an ultrasonic generator. The part to be cut is covered with a coarse paste, and the tip of the vibrating tool is then touched to the paste at the spot where the cutting is to be done. The powerful ultrasonic waves that are set up in the paste will then rub it back and forth to wear away the material at that place. The tool itself never touches the work, and very little^② heat is produced. Holes of almost any shape can be cut in this way. Even the quartz-crystal slices used in the ultrasonic generator itself can be made by the same method.

在金工车间里，超声可用来切削和钻绞硬质材料。该刀具

系一同超声发生器直接连接的金属型片，待切削的部分涂一种粗制的糊剂，然后，正在振动的刀具之尖端，即在须切割的部位，同糊剂相接触，这样，糊剂中所形成的强大的超声波就会将它来回摩擦，从而磨去该处的材料。刀具本身一点也未接触工件，因而并未产生多少热量。几乎对任何形状的孔洞均可采用这样的方法切割，甚至连超声发生器本身所使用的石英晶片也能用同样的方法制成。

① machine shop: 金工车间。 ② little: 少，不多的，表示否定语气；a little 则表示肯定语气，故此处译为“没有……”、“并未……”。

A new kind of dentist's^① drill works in just this way. Because there is scarcely any pressure or heat developed, the drill^② is practically painless.

一种新式牙钻也正是以这一方式工作的。由于几乎没有产生什么压力和热量，因此钻牙简直毫无疼痛。

①dentist: 牙科医师。 ②此处的 drill并非指“钻头”，而指钻牙的动作，故亦可意译为“钻牙时”。

A kind of sonar can be used to find hidden cracks deep inside metal machine parts. A beam of ultrasonic waves sent into a piece

of metal will be reflected from the far side, and also from any flaw or crack in the metal^①. The machine measures how long it takes the waves to go in and bounce back from the far side^②, this tells how far the waves have gone. If, at a certain place, the distance turns out to be^③ smaller, the engineers know that a crack is there. They can even tell exactly how far it is below the surface. The sound-wave method takes the place of^④ the X-ray method; it is safer and easier to use.

Further uses of ultrasound are being discovered all the time.

有一种声纳可用来检测金属机件内深处暗裂缝。将一束超声波送入一片金属内部，它就会从远侧反射回来，同时也会从金属的裂隙或裂缝反射回来。探测机测量出声波进入金属及从远侧反弹回来所花的时间，便可确定出声波所走过的距离。假如某处的距离发现短了一些，工程师便知道裂缝就在那里，他们甚至还能确切地讲出裂缝在表面之下多深的地方。用声波探测法取代 X 光探测法，使用更为安全方便。

超声更广泛的用途正在不断地为人们所发现呢。

此句采用主语分译。

② how long it takes……the far

side; 系动词谓语 measure 的宾语从句。直译为：声波进入（金属）以及从远侧反弹回来要花多长时间。 ③ turn out to be (adj); 原来是..., 结果是...; 最后发现是 ... ④ take the place of; 代替, 取代。

3. The Science of Space

空间科学

The “science of space” is not a new science at all^①. Astronomers, physicists, chemists, and even biologists and geologists have been interested in space problems for centuries. The whole science of astronomy is one part of the science of space.

“空间科学”绝非一门新的科学。数世纪以来天文学家、物理学家、化学家，甚至生物学家及地质学家，一直对空间问题抱有兴趣，而天文学整个学科就是空间科学的一个部分。

① at all：这个短语常用于否定句或条件从句，用以加强语气。此处用一个“绝”字表示，意为“根本”。在下例中，也可用“一点”来表示：He doesn't seem at all interested in my plan.（他对我的计划似乎一点不感兴趣。）有时也可采用其他修辞手段，而不必将 at all 直接译出。例：Do it well if you do it at all.（要做就要做得好。）

Physicists have long been interested^① in space problems: the source of energy of the

sun and the stars (now a problem in nuclear physics); the magnetic fields of the earth, the sun, and other heavenly bodies; cosmic rays; the kinds and amounts of elements and chemical compounds in the stars; and the mechanics by which all the chemical elements have been formed in the universe which once apparently consisted only of hydrogen (and still is mostly hydrogen). We have already seen how modern physics really got its start from the work of Newton on the motion of planets—a space problem.

物理学家长久以来一直很关注空间问题：太阳和恒星的能源（如今已成为核物理学中的一个问题）；地球、太阳和其他天体的磁场；宇宙射线；恒星中元素及化合物的种类和数量；以及一度似乎仅由氢（而目前大部分仍由氢）所构成的宇宙中，形成所有化学元素的途径等等。我们也已了解到，现代物理学实际上是在牛顿关于星球运动所作的工作上发展起来的，而星球运动就是一个空间问题。

① **be interested in...**：对……感兴趣。这个短语使用率很高，但在不同的上下文中，它的汉译也应有变化，不宜一律直译，尤其是在 **be interested in + 动名词（或动词不定式）** 中。例：**We are very interested in working with you.**（我们很愿意同您一起工作。）

Newton pointed out that, in principle^①, an artificial satellite could be put into an orbit around the earth. He even determined the velocity which such an object would require to circle the earth indefinitely: 18,000 miles per hour for an object fairly near the earth and proportionately less^② if the object is lifted to greater distances from the center of the earth.

牛顿曾经指出，人造卫星在原则上是可以放入地球的轨道上的。他甚至还确定了该种物体围绕地球作无限期运转所需的速度：离地球较近的物体为每小时18,000英里；如该物体被送到离地球中心较远的地方，其速度就要按比例递减。

① in principle：大体上，原则上。 ② less: little 的比较级，这是与后面 greater 一词相比较而言的，也即“距离愈大，则速度愈小”之意。

For many years, the thing that stood in the way of^① an artificial satellite was the problem of how to lift a body above the earth's atmosphere and give it the enormous speed required to place it in orbit. The answer came through the work of engineers^② who, urged by military necessity, developed^③ rockets powerful enough to do the job.

多年来，阻碍人造卫星发展的乃是这样一个问题，即如何将某个物体送至地球大气层之外，并给予它进入轨道所需的巨大速度。这一问题由于工程师们的工作而获得解决。他们迫于军事上的需要研制出足以胜任此项工作的火箭。

① *stand in the way of*, 挡……的道 妨碍。 ② *The answer came through the work of engineers...* : 直译为“由于工程师们的工作，（该问题的）解答来到了。”当 *come* 同一个抽象的名词连用时，往往需意译。例如：*A new idea came into his mind.*（他想出了一个新主意。）或（他有了一个新的想法。）*develop*, 发展。这个词在科技文献中极为常见，如果一味译作“发展”，往往会使译文产生歧义，故须按上下文中具体情况译为“研究”、“研制”、“开发”、“发掘”等。同样道理，*development* 一词在汉译时也应有不同的处理方法。例：

Development of sources of energy to accomplish useful work is the key to industrial progress.

（开发能源来做有用的功，是工业发展的关键。）

4. Explorations in Outer Space

外层空间的探索

Today rocket technology, combined with the equally important technology of electronic guidance and communication, makes it possible to lift scientific instruments into space and to explore the phenomena at close range that scientists formerly had to observe from the earth's surface, often hopelessly impeded by the disturbing effects of the earth's atmosphere. ①

过去，科学家们不得不站在地球表面观察空间各种现象，因而常常由于受到地球大气层干扰效应的妨碍而束手无策。如今，火箭技术与同等重要的电子制导及通讯技术相结合，使得科学仪器上天并在近距探索空间现象成为可能。

这是一个长句。处理时，应先弄清关系，区别主次，根据时间和逻辑顺序，重新按汉语习惯加以组合。一般可采取顺序或变序，分译或合译。本句采用的是逆序译法。

A new era of scientific explorations is now open. Physicists have already explored the far reaches of the earth's magnetic field and the magnetic field of the sun. They have discovered the great cloud of charged particles, the Van Allen layer, that is trapped and held by the earth's magnetism. They have discovered (in December 1962 during the voyage of Mariner II) that the planet Venus has only a small magnetic field, if any.

现在，科学探索的新纪元已经开始。物理学家业已对地球的磁场和太阳的磁场进行了广泛深入的探索。他们发现了受到地球磁力陷扰和牵引的带电粒子巨云——范艾伦辐射层。他们于1962年在《玛丽纳二号》的航程中还发现，如果金星也有磁场的话，也只是个小磁场而已。

The cosmic rays, messengers from outer space that were discovered thirty-five years ago, can now be measured directly. Also now directly observable are various kinds of waves that come from the sun and the stars and never get through our atmosphere.^①

来自外层空间的使者——宇宙射线，在三十五年前业已发

现，而今已能直接进行测定。此外，来自太阳和恒星的那些从
不通过地球大气层的各种波，现在也能直接观察到。

此句系倒装句，是将表语和系动词提到主语前面。这是一种常见的语法现象，其中表语可以是形容词（如句中 observable）、副词、介词短语、过去分词等。

We will soon be examining the surface of the moon, learning of its composition; and we will be able to learn something about the moon's interior structure. We have measured at close hand^① the temperature of the high clouds and of the surface of Venus, and soon we will be able to send an exploratory spacecraft to the vicinity^② of the planet Mars.

不久，我们就要对月球表面进行考察，以了解它的组成成分；我们还将有能力认识月球的内部结构。我们已在近处测得了高云和金星两者表面的温度，不久，还将能把探测飞船送到火星附近去呢。

① at close hand : 在近处。 to the vicinity : 至……附近。

All of these things and many more will add to our knowledge and understanding of the

physical universe, will give us new insights^① into the properties of the earth, and tell more of the story^② of how the sun, the earth, and other planets condensed from a vast cloud of gas and dust about four and a half billion years ago.

所有这一切以及其他许多进展，均将增长我们对物质宇宙的知识和了解，赋予我们洞察地球性质的新眼光，并将使我们了解到关于四十五亿年前太阳、地球及其他行星何以由巨大的气尘云凝结而成的更多的内情。

insight : 洞察 (力) ; 见识 ; 洞悉。 ② tell more of the story: 泄漏更多的事实真相。

5. Messages by Meteor

流星传递信息

Meteors are not just pleasing nocturnal pyrotechnics. With ever-greater frequency, these bits of celestial rocks are helping Earth-bound communications stations^① to transmit data without reliance on malfunction-prone satellites.

流星并非单纯是赏心悦目的夜空烟火，随着其出现次数日渐增多，这些空中小石块毫不依靠易出故障的卫星，正在帮助地面通讯站传送信息呢。

① Earth-bound communications stations: 地面通讯站。

As a meteor rockets^① through the atmosphere, it leaves behind a cloud of ionized particles. This energized trail is now being used as a mirror off which weather and military signals can be bounced and transmitted^② to distant receivers.