

Official 02

Passage 01

Desert Formation

The deserts, which already occupy approximately a fourth of the Earth's land surface, have in recent decades been increasing at an alarming pace. The expansion of desertlike conditions into areas where they did not previously exist is called desertification. It has been estimated that an additional one-fourth of the Earth's land surface is threatened by this process.

沙漠已经占据了地球陆地面积约四分之一，而且最近几十年正以惊人的速度扩张。沙漠化是指类似沙漠的环境蔓延到原本并非沙漠的区域。据估计，地球表面另外四分之一的地方正面临沙漠化威胁。

Desertification is accomplished primarily through the loss of stabilizing natural vegetation and the subsequent accelerated erosion of the soil by wind and water. In some cases the loose soil is blown completely away, leaving a stony surface. In other cases, the finer particles may be removed, while the sand-sized particles are accumulated to form mobile hills or ridges of sand.

沙漠化主要通过以下过程实现:首先自然植被不断减少,随后风力和雨水加速了土壤的腐蚀。

有的时候松散的土壤全部被风刮走,留下石质化的表层;其它情况下细小的沙粒可能会被吹走,而正常沙粒大小的砂子不断堆积,从而形成移动的沙丘或者沙脊。

Even in the areas that retain a soil cover, the reduction of vegetation typically results in the loss of the soil's ability to absorb substantial quantities of water. The impact of raindrops on the loose soil tends to transfer fine clay particles into the tiniest soil spaces, sealing them and producing a surface that allows very little water penetration. Water absorption is greatly reduced; consequently runoff is increased, resulting in accelerated erosion rates. The gradual drying of the soil caused by its diminished ability to absorb water results in the further loss of vegetation, so that a cycle of progressive surface deterioration is established.

即便是在保留了土壤表层的区域,植被减少也已成为土壤大量吸取地下水的能力下降的典型因素。雨水对松散土壤的冲击会把细小的粘土颗粒冲到土壤空隙中,封闭了土壤并降低土地表层水的渗透率。地表对水的吸收急剧减少,大量水资源流失,因此土壤的腐蚀率也随即增加。地表吸收水分的能力进一步弱化使得土壤越发干燥,导致植被的进一步流失,于是便形成了土壤沙漠化的恶性循环。

In some regions, the increase in desert areas is occurring largely as the result of a trend toward drier climatic conditions. Continued gradual global warming has produced an increase in aridity for some areas over the past few thousand years. The process may be accelerated in

subsequent decades if global warming resulting from air pollution seriously increases.

在一些地方，沙漠面积的扩大很大程度上归因于干燥的气候条件。在过去的几千年里，不断增加的温室效应使得一些地方干旱问题愈发严重。倘若空气污染带来的温室效应继续恶化，沙漠化进程会在未来数十年内加速实现。

There is little doubt, however, that desertification in most areas results primarily from human activities rather than natural processes. The semiarid lands bordering the deserts exist in a delicate ecological balance and are limited in their potential to adjust to increased environmental pressures. Expanding populations are subjecting the land to increasing pressures to provide them with food and fuel. In wet periods, the land may be able to respond to these stresses. During the dry periods that are common phenomena along the desert margins, though, the pressure on the land is often far in excess of its diminished capacity, and desertification results.

然而，可以肯定的是，大部分地区沙漠化主要都是由于人类活动造成，而非自然条件导致。沙漠边缘的半干旱土地所处的生态平衡环境非常脆弱，环境压力持续增加，而这些半干旱区域适应环境压力的能力极其有限。人口数量的增加使得人们不断向土地施压，依其提供食物和燃料。在湿润的季节里，土地兴许能够应付这些压力。但是在干旱的季节里，在沙漠周边的土地上，存在着这样一个十分普遍的现象：人类对土地施加的压力远远超过了土地自身减压的能力，因此最终形成了沙漠。

Four specific activities have been identified as major contributors to the desertification processes: overcultivation, overgrazing, firewood gathering, and overirrigation. The cultivation of crops has expanded into progressively drier regions as population densities have grown. These regions are especially likely to have periods of severe dryness, so that crop failures are common. Since the raising of most crops necessitates the prior removal of the natural vegetation, crop failures leave extensive tracts of land devoid of a plant cover and susceptible to wind and water erosion.

导致沙漠化的主要因素有四个：过度种植，过度放牧，过分砍伐，过度灌溉。由于人口密度增加，人们对粮食作物的种植已经扩展到日益干燥的区域进行。这些区域很有可能经常会发生干旱，所以农作物种植失败是很正常的事情。大多数农作物的种植需要事先移除天然植被，而农作物欠收后又会留下大面积荒地，非常容易被风力和雨水侵蚀。

The raising of livestock is a major economic activity in semiarid lands, where grasses are generally the dominant type of natural vegetation. The consequences of an excessive number of livestock grazing in an area are the reduction of the vegetation cover and the trampling and pulverization of the soil. This is usually followed by the drying of the soil and accelerated erosion.

在半干旱地区，草坪是主要的天然植被，家畜饲养是当地的一项主要经济活动。在一个地区过量饲养家畜会导致植被覆盖面积减少，土地被大量践踏和碾碎。通常，随之而来的就是土地硬化和加速侵蚀。

Firewood is the chief fuel used for cooking and heating in many countries. The increased pressures of expanding populations have led to the removal of woody plants so that many cities and towns are surrounded by large areas completely lacking in trees and shrubs. The increasing use of dried animal waste as a substitute fuel has also hurt the soil because this valuable soil conditioner and source of plant nutrients is no longer being returned to the land.

在很多国家木材是用来做饭和加热的最主要燃料。人口增加带来的压力促使人们大量砍伐木材，导致许多城市和乡村周围大面积树木和灌木减少。同时人们大量使用烘干的动物排泄物作为替代燃料同样对土壤不利，因为这些珍贵的土壤成分调节剂和植物营养资源将不会再回归至土壤当中。

The final major human cause of desertification is soil salinization resulting from overirrigation. Excess water from irrigation sinks down into the water table. If no drainage system exists, the water table rises, bringing dissolved salts to the surface. The water evaporates and the salts are left behind, creating a white crustal layer that prevents air and water from reaching the underlying soil.

造成土地沙漠化的最后一个主要人为因素在于人类过度灌溉导致土壤的盐碱化。灌溉多余的水渗透到地下水位。假如没有排水系统的存在，那么地下水位上升，把溶解的盐分带到土壤表面。水分蒸发后，盐分留在了表面，形成白色的地壳层，这一地壳层阻止了空气和水接触地底下的土壤。

The extreme seriousness of desertification results from the vast areas of land and the tremendous numbers of people affected, as well as from the great difficulty of reversing or even slowing the process. Once the soil has been removed by erosion, only the passage of centuries or millennia will enable new soil to form. In areas where considerable soil still remains, though, a rigorously enforced program of land protection and cover-crop planting may make it possible to reverse the present deterioration of the surface.

沙漠化问题异常严重，这是因为有很广阔的地区和数量庞大的人群都受到了沙漠化的影响，而且要想逆转沙漠化的进程甚至减缓沙漠化的速度都面临着巨大的困难。一旦土壤被侵蚀，需要再经过几百到上千年的时间才会产生新的土壤。那些大量土壤仍保存完好的地方，亟需一个严谨而有力的保护政策和植被覆盖计划来保护现有土地。

The Origins of Cetaceans

Passage 02

It should be obvious that cetaceans-whales, porpoises, and dolphins-are mammals. They breathe through lungs, not through gills, and give birth to live young. Their streamlined bodies, the absence of hind legs, and the presence of a fluke¹ and blowhole² cannot disguise their affinities with land dwelling mammals. However, unlike the cases of sea otters and pinnipeds (seals, sea lions, and walruses, whose limbs are functional both on land and at sea), it is not easy to envision what the first whales looked like. Extinct but already fully marine cetaceans are known from the fossil record. How was the gap between a walking mammal and a swimming whale bridged? Missing until recently were fossils clearly intermediate, or transitional, between land mammals and cetaceans.

众所周知，鲸类动物是哺乳动物，如鲸鱼、鼠海豚和海豚。它们用肺呼吸，而不是鳃，属于胎生。鲸类动物呈流线型的身体，后腿的消失，尾片和气孔的出现，这些特征都不能掩饰它们和陆生哺乳动物的相似之处。然而，想知道世上第一只鲸长什么样并非易事，不像还原海獭及鳍足类动物（四肢水陆两用如海豹，海狮，海象）的原貌那么简单。一些完全水生的鲸类动物虽然已经灭绝，但仍可通过化石来对它们进行考察。陆栖哺乳动物和海洋鲸类之间有何联系？近期发现的化石已经可以很清晰地帮助人们了解这个问题，以及他们之间的过渡关系。

Very exciting discoveries have finally allowed scientists to reconstruct the most likely origins of cetaceans. In 1979, a team looking for fossils in northern Pakistan found what proved to be the oldest fossil whale. The fossil was officially named *Pakicetus* in honor of the country where the discovery was made. *Pakicetus* was found embedded in rocks formed from river deposits that were 52 million years old. The river that formed these deposits was actually not far from an ancient ocean known as the Tethys Sea.

科学家们通过一些令人振奋的发现重现了鲸类动物几近真实的起源。1979 年，在巴基斯坦北部，一个寻找化石的考察队发掘到了最古老的鲸鱼化石。这块化石被官方命名为 *Pakicetus*，以纪念人们发现它的地方。这块化石是在一条河的沉积岩中发现的，这条河有 5200 万年的历史，离古地中海不远。

The fossil consists of a complete skull of an archaeocyte, an extinct group of ancestors of modern cetaceans. Although limited to a skull, the *Pakicetus* fossil provides precious details on the origins of cetaceans. The skull is cetacean-like but its jawbones lack the enlarged space that is filled with fat or oil and used for receiving underwater sound in modern whales. *Pakicetus* probably detected sound through the ear opening as in land mammals. The skull also lacks a blowhole, another cetacean adaptation for diving. Other features, however, show experts that *Pakicetus* is a transitional form between a group of extinct flesh-eating mammals, the

mesonychids, and cetaceans. It has been suggested that *Pakicetus* fed on fish in shallow water and was not yet adapted for life in the open ocean. It probably bred and gave birth on land.

Pakicetus 包括一个完整原始动物的头盖骨，它的主人是现代鲸类的祖先。尽管只是个头盖骨，但它却提供了研究原始鲸类动物起源的珍贵信息。这个头盖骨和鲸类动物的很像，但它的下颌骨和现代鲸类略有不同，现代鲸类动物的下颌骨中含有额外的空间储存脂肪或者油脂来吸收水下的声音。*Pakicetus* 的主人可能会像陆生哺乳动物那样通过张开的耳朵来探测声音。另外，这个头盖骨没有呼吸孔，而鲸类动物有，这便是鲸类动物为了适应水生环境的另一种适应性表现。然而，专家认为 *Pakicetus* 的其它特征表明它们是已灭绝的食肉哺乳动物（中兽科动物）和鲸类动物的过渡型。有人认为 *Pakicetus* 靠吃浅水的鱼类为生，未能适应在辽阔的大海里生活。它们很有可能在陆地进行生育繁殖。

Another major discovery was made in Egypt in 1989. Several skeletons of another early whale, *Basilosaurus*, were found in sediments left by the Tethys Sea and now exposed in the Sahara desert. This whale lived around 40 million years ago, 12 million years after *Pakicetus*. Many incomplete skeletons were found but they included, for the first time in an archaeocyte, a complete hind leg that features a foot with three tiny toes. Such legs would have been far too small to have supported the 50-foot-long *Basilosaurus* on land. *Basilosaurus* was undoubtedly a fully marine whale with possibly nonfunctional, or vestigial, hind legs.

1989 年，在埃及有了另一个重大发现。人们在古地中海残留的沉积物中发现了另一类早期鲸鱼 *Basilosaurus* 的一些骨骸，这些骨骸如今暴露在撒哈拉大沙漠上。*Basilosaurus* 生活在大约 4000 万年前，比 *Pakicetus* 鲸鱼晚了 1200 万年。尽管发现的这些骨骼并不完整，但这是专家们第一次在原始动物身上发现完整的后肢，它有三个小脚趾作为的足部特征。可这些后肢还太小，远无法支撑 50 英尺长的 *Basilosaurus* 在陆地行走。因此，*Basilosaurus* 必定是完全水生的鲸鱼，它们的后肢已经不起任何作用，或者说已经退化。

An even more exciting find was reported in 1994, also from Pakistan. The now extinct whale *Ambulocetus natans* ("the walking whale that swam") lived in the Tethys Sea 49 million years ago. It lived around 3 million years after *Pakicetus* but 9 million before *Basilosaurus*. The fossil luckily includes a good portion of the hind legs. The legs were strong and ended in long feet very much like those of a modern pinniped. The legs were certainly functional both on land and at sea. The whale retained a tail and lacked a fluke, the major means of locomotion in modern cetaceans. The structure of the backbone shows, however, that *Ambulocetus* swam like modern whales by moving the rear portion of its body up and down, even though a fluke was missing. The large hind legs were used for propulsion in water. On land, where it probably bred and gave birth, *Ambulocetus* may have moved around very much like a modern sea lion. It was undoubtedly a whale that linked life on land with life at sea. . Fluke: the two parts that constitute the large triangular tail of a whale².

1994 年，巴基斯坦报道了一个更令人兴奋的发现。目前已经灭绝的鲸鱼 *Ambulocetus natans*（可以步行的鲸类）4900 万年前曾在古地中海生活过。比 *Pakicetus* 晚大约 300 万年，比 *Basilosaurus* 早 900 万年左右。幸运的是，被发现的 *Ambulocetus natans* 保留着完整的后肢。它的后肢很强壮，底部有长足，非常像现在的鳍足类动物。这些后肢使得它们既能在陆地行走又能在海里游行。虽然 *Ambulocetus natans* 保留了尾巴，但它们缺少现代水生鲸类动物用于行动的主要身体部位——尾片。不过，从 *Ambulocetus* 的脊椎结构上可以看出，即使缺少尾片，它们也能像现代鲸鱼那样通过身体背部的上下摆动来游走。大的后肢通常被当作是水中前行的发动机。在它们可能交配繁殖的陆地上，*Ambulocetus* 行动起来非常像现代海狮。毫无疑问，鲸鱼是连接着陆地生命和海洋生命的物种。

Passage 03

Early Cinema

The cinema did not emerge as a form of mass consumption until its technology evolved from the initial "peepshow" format to the point where images were projected on a screen in a darkened theater. In the peepshow format, a film was viewed through a small opening in a machine that was created for that purpose. Thomas Edison's peepshow device, the Kinetoscope, was introduced to the public in 1894. It was designed for use in Kinetoscope parlors, or arcades, which contained only a few individual machines and permitted only one customer to view a short, 50-foot film at any one time. The first Kinetoscope parlors contained five machines. For the price of 25 cents (or 5 cents per machine), customers moved from machine to machine to watch five different films (or, in the case of famous prizefights, successive rounds of a single fight).

电影院的播放技术从最初的西洋镜形式演变为将影像投影到幽暗的影院屏幕，这一转变使得电影院大众化消费成为可能。在通过西洋镜播放电影的年代里，人们只能通过播放仪器的一个专门设置的小窗口来看电影。到了 1894 年，托马斯·爱迪生发明的活动电影放映机公布于众，这种放映机仅适用于活动电影放映室或电影娱乐城。它里面仅包含少量的独立播放器，每次仅允许一个顾客观看一部 50 张胶卷的小短片。第一个电影放映厅的放映机中有五台播放器。价格是 25 美分/次，（每台播放器观看价格是 5 美分）。观众们从一个播放器换到下一个播放器依次观看不同的影片（就像有名的职业拳击赛，每场都要连续进行好几轮比赛）。

These Kinetoscope arcades were modeled on phonograph parlors, which had proven successful for Edison several years earlier. In the phonograph parlors, customers listened to recordings through individual ear tubes, moving from one machine to the next to hear different recorded speeches or pieces of music. The Kinetoscope parlors functioned in a similar way. Edison was more interested in the sale of Kinetoscopes (for roughly \$1,000 apiece) to these parlors than in the films that would be run in them (which cost approximately \$10 to \$15 each). He refused to develop projection technology, reasoning that if he made and sold projectors, then exhibitors would purchase only one machine-a projector-from him instead of several.

这些电影播放厅是仿照留声机播放厅设计的，这也证明了爱迪生前几年的设计非常成功。在留声机播放厅中，顾客们通过独立的耳管听取已经录制好的声音，从一台机器换到另一台听取不同演讲或音乐的录音。电影放映室的功能与之类似。相比之下，爱迪生对这些电影放映机（每台一千美元）的销售更感兴趣，而不是那些需要放映的电影（每部 10-15 美元）。他不愿研究投影技术，因为他认为如果研发并且销售投影机，电影放映者就只会买一台投影机而不是几台。

Exhibitors, however, wanted to maximize their profits, which they could do more readily by projecting a handful of films to hundreds of customers at a time (rather than one at a time) and by charging 25 to 50 cents admission. About a year after the opening of the first Kinetoscope parlor

in 1894, showmen such as Louis and Auguste Lumiere, Thomas Armat and Charles Francis Jenkins, and Orville and Woodville Latham (with the assistance of Edison's former assistant, William Dickson) perfected projection devices. These early projection devices were used in vaudeville theaters, legitimate theaters, local town halls, makeshift storefront theaters, fairgrounds, and amusement parks to show films to a mass audience.

然而，电影放映者们期望将自己的收益最大化，他们希望能更简易地将少量电影同时放映给几百个顾客（而不是每次为一个顾客播放一次电影），每次收入场费 25 到 50 美分。在 1894 年电影放映机公布的一年之后，剧场经理人如 Louis 和 Auguste Lumiere, Thomas Armat 和 Charles Francis Jenkins, Orville 和 Woodville Latham 以及爱迪生先前的助手 William Dickson 将投影设备变得更加完善。这些早期的投影机在众多场合为大众观众播放电影，如：杂技剧团、正当的影院、当地镇上的礼堂、临时的影院店面、露天游乐场和游乐园等。

With the advent of projection in 1895-1896, motion pictures became the ultimate form of mass consumption. Previously, large audiences had viewed spectacles at the theater, where vaudeville, popular dramas, musical and minstrel shows, classical plays, lectures, and slide-and-lantern shows had been presented to several hundred spectators at a time. But the movies differed significantly from these other forms of entertainment, which depended on either live performance or (in

the case of the slide-and-lantern shows) the active involvement of a master of ceremonies who assembled the final program.

随着 1895-1896 年间投影机的到来，电影成为了大众消费的最终形式。在此之前，一群观众坐在剧场里观看表演，在那里几百个观众可以同时观看轻歌舞剧、流行戏剧、音乐剧、歌唱表演、古典演奏、演讲和胶片演示等。电影与这些娱乐形式明显的不同点是，电影无需依赖现场表演，也不需要串联全场节目的主持人的积极参与（例如胶片演示）。

Although early exhibitors regularly accompanied movies with live acts, the substance of the movies themselves is mass-produced, prerecorded material that can easily be reproduced by theaters with little or no active participation by the exhibitor. Even though early exhibitors shaped their film programs by mixing films and other entertainments together in whichever way they thought would be most attractive to audiences or by accompanying them with lectures, their creative control remained limited. What audiences came to see was the technological marvel of the movies; the lifelike reproduction of the commonplace motion of trains, of waves striking the shore, and of people walking in the street; and the magic made possible by trick photography and the manipulation of the camera.

尽管早期的电影放映者通常在电影放映时伴有现场表演，但是电影本身的内容是影院事先大量录制下来的，这些材料能在没有表演者或者表演者较少参与的情况在电影院中轻松地再现。即便这样，早期的电影放映者还是将电影和其它娱乐节目或者演讲结合在一起，他们认为用这样的方法能最大限度的吸引观众，他们管理的创造力还是非常有限的。观众们在这里可以

看到的电影技术里的奇迹；生活琐事的重现，如火车的运动，海浪拍击海岸，人们在街上行走等；以及由摄影特技和相机操控做出来的特效。

With the advent of projection, the viewer's relationship with the image was no longer private, as it had been with earlier peepshow devices such as the Kinetoscope and the Mutoscope, which was a similar machine that reproduced motion by means of successive images on individual photographic cards instead of on strips of celluloid. It suddenly became public-an experience that the viewer shared with dozens, scores, and even hundreds of others. At the same time, the image that the spectator looked at expanded from the minuscule peepshow dimensions of 1 or 2 inches (in height) to the life-size proportions of 6 or 9 feet.

伴随投影机的到来，电影不再属于个别人的消费品。就像之前西洋镜时代的播放设备，如活动电影播放机和早期电影播放机，早期电影播放机播放的都是一系列独立的图像而不是胶片，把单个摄影卡上的图片串联起来形成影像。投影技术使得电影变得更加大众化了，观众能够和十二个、二十个、甚至是上百个人共同观看一部电影。与此同时，观众所看到的图像大小也从狭小的 1 英寸或 2 英寸西洋镜高度扩展到与实物状的 6 英尺或 9 英尺。