

TPO 12 – 1 Which Hand Did They Use 他们到底用哪只手

We all know that many more people today are right-handed than left-handed. Can one trace this same pattern far back in prehistory? Much of the evidence **about right-hand versus left-hand dominance** comes from **stencils** and prints **found in rock shelters in Australia and elsewhere, and in many Ice Age caves in France, Spain, and Tasmania**. When a left hand has been stenciled, this implies that the artist was right-handed, and vice versa. Even though the **paint** was often sprayed on by mouth, one can assume that the dominant hand assisted in the operation. One also has to make the assumption that hands were stenciled palm downward—a left hand stenciled palm upward might of course look as if it were a right hand. Of 158 stencils in the French cave of Gargas, 136 have been identified as left, and only 22 as right; right-handedness was **therefore** heavily predominant.

我们都知道，现在的人们更多是使用右手而非左手。能不能在史前查找出这一相似的状况呢？有太多的来自澳大利亚地区的**石屋**中**模板**和字迹以及冰河期法国西班牙以及塔斯马尼亚地区的岩洞上搜集到的证据证明右手较之于左手的优势。当一个左手被用于塑模时暗示了制作他的工匠惯于使用右手，反之亦然。即使是制作一幅画作需要用嘴喷涂，也可以想象惯用手是如何在这一过程中起到协助作用的。另一个假设是被用于塑模的手手掌向下——一只左手塑模朝上也许让它看起来像一只右手。在法国 Gargas 岩洞中的 158 个模板中，有 136 个鉴定确认为左手，只有 22 个是右手；右手习惯毫无疑问是据绝对主导地位的。

Cave art **furnishes** other types of evidence of this phenomenon. **Most engravings, for example, are best lit from the left**, as befits the work of right-handed artists, ~~who generally prefer to have the light source on the left so that the shadow of their hand does not fall on the tip of the engraving tool or brush.~~ **In the few cases** where an Ice Age figure is depicted holding something, it is mostly, though not always, in the right hand.

岩洞艺术的其他形式也为这一现象提供了依据。例如大多数的雕版都是左起的光照最好，因为是配合惯用右手的工匠的工作，他们经常喜欢让光线从左边照过来以便他们手的影子不会投射在雕版工具或是刷子的**末端**。很多冰河时期的雕塑都被雕刻为拿着一些物品的模样，尽管不是绝对的，但是起码大多数都是放在右手上。

Clues to **right-handedness** can also be found by **other** methods. Right-handers tend to have longer, stronger, and more muscular bones on the right side, and Marcellin Boule as long ago as 1911 noted the La Chapelle-aux-Saints Neanderthal skeleton had a right upper arm bone that was noticeably stronger than the left. Similar observations have been made on other Neanderthal skeletons such as La Ferrassie I and Neanderthal itself.

其他方法也能找出使用右手习惯的线索。右撇子的右侧身体会趋于更长，更壮且更多肌肉的骨骼，Marcellin Boule 早在 1911 提到的一块名为 La Chapelle-aux-Saints 的尼安德特人的右上臂骨架骨骼要明显强壮于左侧。对其他尼安德特人的骨架的调查也得到了类似的结果。例如 La Ferrassie 1 和尼安德特人本身。

Fractures and other cut marks are another source of evidence. Right-handed soldiers tend

批注 | 1: stencil

英 ['stens] 美 ['stens]

•n. 漏字板

批注 | 2: 看清主语!

批注 | 3: furnish

英 ['fɜːnɪʃ] 美 ['fɜːrniʃ]

•vt. 提供; 供应; 装备

furnishes evidence of...

为...提供了依据

批注 | 4: In the few cases

少数情况下...

批注 | 5: right-handedness

[raɪt 'hændɪdnəs]

•n. 右利, 善用右手

批注 | 6: fracture

英 ['fræktʃə(r)] 美 ['fræktʃər]

•n. 破裂, 断裂; [外科] 骨折

•vi. 破裂; 折断

•vt. 使破裂

to be wounded on the left. The skeleton of a 40- or 50-year-old Nabatean warrior, buried 2,000 years ago in the Negev Desert, Israel, had multiple healed **fractures** to the skull, the left arm, and the ribs.

断裂痕与割伤痕也是论据的另一来源。右撇子勇士一般都是左侧容易受伤。在内盖夫的戈壁中被埋了 2 000 多年的一个 40~50 岁之间的 Nabatean 勇士的骨架，在他的头部、左臂和肋骨上有多处已愈合的伤痕。

Tools themselves can be revealing. Long-handed Neolithic spoons of yew wood preserved in Alpine villages dating to 3000 B.C., have survived; the signs of **rubbing** on **their** left side indicate that their users were right-handed. The late Ice Age rope found in the French cave of Lascaux consists of fibers spiraling to the right, and was therefore **tressed** by a right hander.

工具的本身也会反映这一现象。新石器时代的紫杉木的长柄勺从史前 3 000 年一直完好地保存到现在；它左侧的磨痕证明了它们的主人惯用右手。在法国的拉斯科岩洞艺术找到的冰川时代末期的绳子是由向右旋转的纤维捆成的，当然也就证实了出自右撇子之手。

Occasionally one can determine whether stone tools were used in the right hand or the left, and it is even possible to **assess** how far back this feature can be traced. In stone toolmaking experiments, Nick Toth, a right-hander, held the core (the stone that would become the tool) in his left hand and the hammer stone in his right. As the tool was made, the core was rotated clockwise, and the **flakes**, removed in sequence, had a little **crescent of cortex** (the core's outer surface) on the side. Toth's **knapping** produced 56 percent flakes with the cortex on the right, and 44 percent left-oriented flakes. A left-handed toolmaker would produce the opposite pattern. Toth has applied these criteria to the similarly made pebble tools from a number of early sites (before 1.5 million years) at Koobi Fora, Kenya, probably made by Homo habilis. At seven sites he found that 57 percent of the flakes were right-oriented, and 43 percent left, a pattern almost **identical to** that produced today.

偶尔也能确定石器是左手使用还是右手使用，甚至可以**查出**这些特征是在多久前的过去被留下的。在石器制造试验中，Nick toth,一个右撇子用左手拿着一个石胚（就是一块是要成为工具的石头）同时用右手抡锤。由于工具的作用，胚子顺时针的旋转的同时，小**碎片**一点点的去掉，在一侧留下月牙状的表层（石头胚子的表面）。Toth's 的敲打产生的碎痕 56%留在了右侧的表面，44%留在了左侧朝向的碎痕。一个左撇子工匠则会生产出相反的花纹，Toth 将这种标准对照到数个在 Kombi Fora（距今一百五十万年前）发现的类似卵石工具上，他在 7 个地点找到的 57%的碎痕是右侧朝向，而百 43%是左侧朝向，就和今天我们所生产的花纹一样。

批注 [7]: 注意 themselves 的翻译方法:【XXX 的本身】

批注 [8]: rubbing

英 ['rʌbɪŋ] 美 ['rʌbɪŋ]

- n. 摩擦；研磨；摹拓
- v. 摩擦；按摩；触痛（rub 的 ing 形式）

rub

英 [rʌb] 美 [rʌb]

- vt. 擦；摩擦；惹怒
- vi. 擦；摩擦；擦破
- n. 摩擦；障碍；磨损处

批注 [9]: their 指的是勺子。

批注 [10]: tress

英 [tres] 美 [tres]

- n. 一绺头发；发辫；卷发；枝条
- vt. 把（头发）梳理成绺

批注 [11]: crescent

英 ['kresnt; 'kreznt] 美 ['kresnt]

- n. 新月；新月状物；伊斯兰教的标记；土耳其的新月形国徽
- adj. 新月形的；逐渐增加的
- vt. 以新月形物装饰；使成新月形

批注 [12]: cortex

英 ['kɔːteks] 美 ['kɔːteks]

- n. [解剖] 皮质；树皮；果皮

批注 [13]: knap

英 [næp] 美 [næp]

- v. 打碎，敲击（石器）
- n. 小山顶，丘顶

批注 [14]: identical to

英 美 [aɪ'dentɪkl tu]

- 同一的，同样的；和...相同

About 90 percent of modern humans are right-handed: we are the only mammal with a **preferential** use of one hand. The part of the brain *responsible for fine control and movement* is located in the left **cerebral** hemisphere, and the findings above suggest that the human brain **was** already **asymmetrical in** its structure and function **not long after 2 million years ago**. Among Neanderthals of 70,000–35,000 years ago, Marcellin Boule noted that the La Chapelle-aux-Saints individual had a left hemisphere slightly bigger than the right, and the same was found for brains of specimens from Neanderthal, Gibraltar, and La Quina.

大约 90%的现代人是右撇子；我们都是只是优先使用一只手的哺乳动物。大脑负责良好的控制行动的区域位于脑部的左半球，这也证明的人类大脑的机构和功能上的不对称性在两百万年前就已经定型了。在距今 70 000 到 35 000 年的尼安德特人中，Marcellin Boule 发现 La Chapelle-aux-Saints（某人种吧）个体的大脑左半球稍微比右边大一点，与之类似的也被发现在尼安德特人、直布罗陀人和拉昆尼亚人种的脑型中。(Chinese)

批注 [15]: **preferential**

英 [ˌprefə'renʃl] 美 [ˌprefə'renʃl]

•adj. 优先的；选择的；特惠的；先取的

批注 [16]: a preferential use of

优先使用

批注 [17]: **cerebral**

英 [sə'reɪbrəl] 美 [sə'reɪbrəl]

•adj. 大脑的，脑的

TPO 12 – 2 Transition to Sound in Film 电影声音的演变

The shift ~~from silent to sound film~~ **at the end of the 1920s** marks, so far, the most important transformation in motion picture history. Despite all the highly visible technological developments in **theatrical** and **home delivery of the moving image** that have occurred over the decades since then, no single innovation **has come close to being regarded as** a similar kind of **watershed**. In nearly every language, however the words are **phrased**, the most basic **division** in cinema history **lies between** films that are mute **and** films that speak.

二十世纪二十年代末见证了电影史上最重大的一次过渡——电影从无声到有声的跨越。尽管在**戏剧和家庭移动影像的传输方面**的高级视觉技术在此之前已经发展了数十年，却依然没有哪项革新可以像这项技术一样成为分水岭。几乎所有语言都是这样描述的（尽管措辞略有出入）：电影史上最基本的分水岭就是从默片到有声电影的过渡。

Yet this most **fundamental** standard of historical periodization conceals **a host of paradoxes**. Nearly every movie theater, **however modest**, had a piano or organ to provide musical accompaniment to silent pictures. In many instances, spectators **in the era before recorded sound** experienced **elaborate aural presentations** alongside movies' visual images, from the Japanese benshi (narrators) crafting multivoiced dialogue narratives to original musical compositions performed by symphony-size orchestras in Europe and the United States. In Berlin, for the **premiere performance** **outside the Soviet Union of *The Battleship Potemkin***, film director Sergei Eisenstein worked with Austrian composer Edmund Meisel (1874-1930) on a musical score matching sound to image; the Berlin screenings with live music helped to bring the film its wide international fame.

然而这一历史分期的基本标准下依然矛盾重重。几乎每家剧院都配备钢琴或管风琴为无声电影配乐，**尽管不起眼**。在一些实例中，录音时代之前的观众都有亲身体验，电影放映时旁边是**精妙绝伦的音效呈现**，从绝妙的日本 benshi(口技)多音效对话演绎到欧美管弦交响乐队演奏的原创曲目。为了首次在柏林露天公演前苏联战舰波将金号，该片导演 **Sergei Eisenstein** 与奥地利作曲家 **Edmund Meisel** (1874-1930) 合作为电影配乐；柏林的电影荧幕配上现场音乐使得这一影片在国际上赢得广泛赞誉。

Beyond that, the triumph of recorded sound has overshadowed the rich diversity of technological and aesthetic experiments with the visual image that were going forward simultaneously in the 1920s. New color processes, larger or differently shaped screen sizes, multiple-screen projections, even television, were among the developments invented or tried

批注 | 18]: 已经接近被认为是

批注 | 19]: **watershed**

英 ['wɔ:təʃed] 美 ['wɔ:tərʃed]

•n. (美) 流域; 分水岭; 集水区; 转折点

•adj. 标志转折点的

批注 | 20]: **phrase**

英 [freɪz] 美 [freɪz]

•n. 短语, 习语, 措辞, 乐句

•vt. 措词, 将(乐曲)分成乐句

批注 | 21]: **fundamental**

英 [ˌfʌndə'mentl] 美 [ˌfʌndə'mentl]

•adj. 基本的, 根本的

•n. 基本原理; 基本原则

批注 | 22]: **paradox**

英 ['pærədɒks] 美 ['pærədəːks]

•n. 悖论, 反论; 似是而非的论点; 自相矛盾的人或事

•n. (Paradox) 《杀破狼: 贪狼》(一部剧情动作电影)

批注 | 23]: **a host of**

•许多, 一大群; 众多, 大量

批注 | 24]: **aural**

英 ['ɔ:ɹəl] 美 ['ɔ:ɹəl]

•adj. 听觉的; 耳的; 气味的; 先兆的

批注 | 25]: **premiere**

英 ['premiə(r)] 美 [prɪ'miɹ,prɪ'mjɹ]

•n. (电影、戏剧的) 首次公演

•v. 首次上演; 首次露面; 首次公演(戏剧、音乐等)

•adj. 首要的; 最早的

premiere performance

首演

out during the period, sometimes **with startling success**. The high costs of converting to sound and the early limitations of sound technology were among the factors that **suppressed** innovations or **retarded** advancement in these other areas. The introduction of new screen formats was **put off for a quarter century**, and color, though utilized over the next two decades for special productions, also did not become a norm until the 1950s.

除此之外, 录音的辉煌还使得 1920 年代同时发展的视觉影像技术和审美体验的成就相形见绌。在这期间新技术新发明层出不穷, 有一些技术非常成功: 新的色彩处理, 更大以及不同形状的画面尺寸, 多屏放映的设计, 甚至是电视机的出现。声音转化的高成本和早期声音技术的局限阻碍了这些发明在其所在其他领域的发展。**25 年之后**新型屏幕设计才得以引进, 并且尽管色彩在接下来的 20 年中都用于专业生产, 但一直到 20 世纪 50 年代才成为一项标准。

【**Though** it may be difficult to imagine from a later perspective, **a strain of critical opinion in the 1920s** predicted that sound film would be a technical novelty that would soon fade from sight, just as had many previous attempts, **dating well back** before the First World War, to link images with recorded sound】. These critics were **making a common assumption**—that the technological inadequacies of earlier efforts (poor synchronization, weak sound amplification, fragile sound recordings) would **invariably** occur again. **To be sure**, their evaluation of the technical **flaws** in 1920s sound experiments **was not so far off the mark**, yet they neglected to take into account important new forces in the motion picture field that, **in a sense**, would not take **no** for an answer.

虽然现在看来不可思议, 但是在 19 世纪 20 年代, 一连串的批判性观点预测有声电影这项新“玩意儿”技术将会迅速淡出人们的视线, 和第一次世界大战之前将画面与录音连接在一起的多次尝试并无二致。这些批评有一个共同的假设——早期成果的技术缺陷(同步性差、差的扩音、易损坏的录音)仍会不可避免的发生。不可否认他们对 1920 年代声音试验的技术缺陷的评价(与真实情况)相去不远, 但是他们忽视了电影领域的新生力量, 这些新力量决不接受“不”这个回答。

These forces were the rapidly expanding electronics and telecommunications **companies that were developing and linking telephone and wireless technologies in the 1920s**. In the United States, they included such firms as American Telephone and Telegraph, General Electric, and Westinghouse. They **were interested in** all forms of sound technology and all potential avenues for commercial exploitation. **Their** competition and collaboration were creating the broadcasting industry in the United States, **beginning with the introduction of commercial radio programming in the early 1920s**. With financial **assets** considerably **greater** than those in the motion picture industry, **and perhaps a wider vision of** the relationships among entertainment and communications media, they **revitalized** research into recording sound for motion pictures.

20 世纪 20 年代, 这些新生力量迅猛发展, 出现了大量连接电话与无线技术的电子及通讯公司。在美国, 还出现了像美国电话电报公司、通用电气和西屋电气这样的公司。他们对声音技术的各种形式和一切商业开发潜力非常感兴趣。这些竞争与合作开创了美国的广播产业, 20 世纪 20 年代早期开始引入商业广播节目。由于金融资产明显多于电影产业, 而且他们在娱乐业与通信媒体之间的关系上**前景更为广阔**, 因而他们使研究电影配音得到复兴。

批注 [26]: **startling**

英 ['stɑ:tɪŋ] 美 ['stɑ:rtɪŋ]

•adj. 令人吃惊的

with startling success

取得惊人的成功。

批注 [27]: **retard**

英 ['rɪtɑ:d] 美 ['rɪ'tɑ:rd; 'rɪtɑ:rd]

•vt. 延迟; 阻止; 妨碍; 使减速

•vi. 减慢; 受到阻滞

•n. 延迟; 阻止

批注 [28]: **put off**

•推迟; 扔掉; 阻止

批注 [29]: **invariably**

英 [ɪn'veəriəbli] 美 [ɪn'veəriəbli]

•adv. 总是; 不变地; 一定地

批注 [30]: **in a sense**

英 美 [ɪn ə sens]

•在某种意义上

批注 [31]: **revitalize**

英 [,rɪ:'vaɪtəlaɪz] 美 [,rɪ:'vaɪtəlaɪz]

•vt. 使...复活; 使...复兴; 使...

恢复生气

In 1929 the United States **motion picture industry** released more than 300 sound films- (~~a rough figure~~, since) ~~a number were silent films with music tracks, or films prepared in dual versions,~~ to **take account of** the many cinemas **not yet wired** for sound. At the production level, in the United States the conversion was **virtually** complete by 1930. In Europe it took a little longer, mainly because there were more small producers for whom the costs of sound were prohibitive, and in other parts of the world problems with rights or access to equipment delayed the shift to sound production for a few more years (though cinemas in major cities may have been wired in order to play foreign sound films). The triumph of sound cinema was **swift**, complete, and enormously popular.

粗略计算，1929年美国的**电影产业**上映的有声电影超过300部，~~同时还有~~（一个粗略的数字，因为有）一定数量的带有音乐伴奏的默片和两个版本都有的电影，以照顾一些未配备音响的电影院。美国于1930年最终完成生产环节上的转换。欧洲耗时更久一些，这主要因为很多小生产商无法负担的音效成本，另一部分原因是专利权和许可设备配备问题使得声音制作的转换推迟了几年（尽管很多大城市的电影院可能为了播放国外的有声电影配备了设备）。至此，有声电影取得胜利，并**迅速**、全面、广泛地流行起来。

世界著名的电工设备制造企业。1886年1月8日，由乔治·威斯汀豪斯在美国宾夕法尼亚州创立。总部设在宾夕法尼亚州匹兹堡市。1889年时曾改名西屋电工制造公司（Westinghouse Electric Manufacturing Company），1945年10月改用现名。

4英寸等于101.6毫米。

批注 | 32]: a rough figure
粗略的数字

批注 | 33]: take account of
英美
•考虑到；顾及；体谅

批注 | 34]: wire
英 ['waɪə(r)] 美 ['waɪər]
•n. 电线；金属丝；电报
•vt. 拍电报；给...装电线
•vi. 打电报

not yet wired for sound
还没装好声音

批注 | 35]: virtually
英 ['vɜ:rtʃuəli] 美 ['vɜ:rtʃuəli]
•adv. 事实上，几乎；实质上

TPO 12 – 3 Water in the Desert 沙漠中的水源

Rainfall is not completely absent in desert areas, but it is highly variable. An annual rainfall of four inches is **often** used to define the limits of a desert. The impact of rainfall upon the surface water and groundwater resources of the desert is greatly influenced by **landforms**. Flats and depressions where water can collect are common features, but they **make up** only a small part of the **landscape**.

沙漠中并不是完全没有降雨，只不过变数很大。通常年降水量 100 毫米以下 是界定沙漠地区的条件。降水对沙漠地区地表和地下水资源的影响很大程度上取决于地貌。平原和洼地的共同特征是水源聚集，但是它们在地貌中**所占比重**很小。

Arid lands, surprisingly, contain some of the world's largest river systems, such as the Murray-Darling in Australia, the Rio Grande in North America, the Indus in Asia, and the Nile in Africa. These rivers and river systems are known as "exogenous" because their sources **lie outside the arid zone**. They are vital for sustaining life in some of the driest parts of the world. For centuries, the annual floods of the Nile, Tigris, and Euphrates, for example, have brought fertile silts and water to the inhabitants of their lower valleys. Today, **river discharges** are increasingly controlled by human intervention, creating a need for international **river-basin** agreements. The filling of the Ataturk and other dams in Turkey has **drastically** reduced **flows** in the Euphrates, with potentially serious consequences for Syria and Iraq.

令人惊奇的是，一些世界最大的河系都位于干旱地区，例如澳大利亚的墨累-达令河、北美洲的格兰德河、亚洲的印度河以及非洲的尼罗河。这些河流及河系因为源头**位于干旱地区以外**而被称为“外流河”。对世界上一些最干旱地区来说，它们哺育生命，意义重大。例如，几个世纪以来，尼罗河、底格里斯河和幼发拉底河每年都会泛滥洪水会为下游低洼地带的居民带来大量肥沃的泥沙和水源。现在，**河水流量**越来越多的受到人类的干预，因而有必要签署国际性的河流流域协议。阿塔图尔克大坝以及土耳其境内的其它大坝的蓄水**极大地**减少了幼发拉底河的**径流量**，可能会给叙利亚和伊拉克带来严重后果。

The flow of exogenous rivers varies with the season. The desert sections of long rivers respond several months after rain has fallen outside the desert, so that peak flows may be in the dry season. This is useful for irrigation, but the high temperatures, low humidities, and different day lengths of the dry season, compared to the normal growing season, can present difficulties with some crops.

“外流河”的径流量通常受季节影响。雨季过后，从外部流入沙漠区域的长河可以持续好几个月，以便洪峰可以出现在旱季。这虽然利于灌溉，但是高温、低湿度，加上旱季独特的昼长，相比正常生长季节依然很难种植一些农作物。

Regularly flowing rivers and streams that originate within arid lands are known as

批注 | 36]: landform

英 ['lændfɔ:m] 美 ['lændfɔ:r
m]

•n. [地理] 地形

批注 | 37]: landscape

英 ['lændskeɪp] 美 ['lændskeɪ
p]

•n. 风景；风景画；景色；山水
画；乡村风景画；地形；（文件
的）横向打印格式

•vt. 对...做景观美化，给...做园
林美化；从事庭园设计

•vi. 美化（环境等），使景色宜
人；从事景观美化工作，做庭园
设计师

批注 | 38]: river discharge

•河量；河道流量

批注 | 39]: river basin

•[水文] 流域

批注 | 40]: 注意每段的第一句
话，一般 TOEFL 的最后一道题
的解析，都来自于每段的首句：
**选项 A 和第 1 段首句对应，正
确。**

"endogenous." These are generally **fed by** groundwater springs, and many **issue from** limestone **massifs**, such as the Atlas Mountains in Morocco. Basaltic rocks also support springs, **notably** at the Jabal Al-Arab on the Jordan-Syria border. Endogenous rivers often do not reach the sea but drain into inland basins, where the water evaporates or is lost in the ground. Most desert streambeds are normally dry, but they **occasionally** receive large flows of water and sediment.

通常发源于干旱地区的河流和溪水被称为“内陆河”。它们主要是**由地下水泉补给**,很多出口来自石灰岩断层,例如摩洛哥的阿特拉斯山脉。玄武岩同样可以提供地下水泉,**最具代表性的是**约旦和叙利亚边界的 **Jabal Al-Arab** 河.内陆河通常都不能流入大海而是注入内陆盆,蒸发掉或者消失在地表。大多数沙漠河床通常都是干涸的,但**偶有**较大径流和沉积物。

Deserts contain large amounts of groundwater when compared to the amounts **they hold in surface stores** such as lakes and rivers. But only **a small fraction of** groundwater enters the **hydrological cycle** *feeding the flows of streams, maintaining lake levels, and being recharged (or refilled) through surface flows and rainwater*. In recent years, groundwater has become an increasingly important source of freshwater for desert **dwellers**. The United Nations Environment Programme and the World Bank **have funded attempts to** survey the groundwater resources of arid lands and to develop appropriate extraction techniques. Such programs are much needed because in many arid lands there is only a vague idea of the extent of groundwater resources. It is known, however, that the distribution of groundwater is uneven, and that much of it lies at great depths.

相比于湖泊和河流等地表水,沙漠中地下水的贮藏量要大得多。不过只有**一小部分**地下水参与了水循环——补给河流径流量,维持湖泊水位,并通过地表径流和降雨进行再次补给(再注入)。近些年来,地下水作为沙漠**住民**的淡水来源,重要性日益突显。美国国家环境总署和世界银行**开始拨款着手**调查干旱地区的地下水资源并开发合适的开采技术。这些项目非常有必要,因为在很多干旱地区对于地下水资源的程度概念非常模糊。然而可以确定的是,地下水资源分布非常不均匀,且大部分埋藏较深。

Groundwater is stored in the pore spaces and **joints** of rocks and unconsolidated (unsolidified) sediments or in the openings widened through **fractures** and weathering. The water-saturated rock or sediment is known as an "aquifer". Because they are porous, sedimentary rocks, such as sandstones and conglomerates, are important potential sources of groundwater. Large quantities of water may also be stored in limestones when joints and cracks have been enlarged to form cavities. Most limestone and sandstone aquifers are deep and extensive but may contain groundwaters that are not being recharged. Most shallow aquifers in sand and gravel deposits **produce lower yields**, but they can be rapidly recharged. Some deep aquifers are known as "fossil" waters. The term "fossil" describes

批注 [41]: issue

英 ['ɪʃuː; 'ɪsjuː] 美 ['ɪʃuː]

- n. 问题; 流出; 期号; 发行物
- vt. 发行, 发布; 发给; 放出, 排出
- vi. 发行; 流出; 造成……结果; 传下

批注 [42]: issue from

['ɪʃuː frəm]

- v. 由...产生; 传下; 从...流出

批注 [43]: massif

英 [mæ'siːf] 美 [mæ'siːf]

- n. 山丘, 群山; 断层块

批注 [44]: hydrological cycle

- 水循环; 水分循环

批注 [45]: dweller

英 ['dwelə(r)] 美 ['dwelər]

- n. 居民, 居住者

inhabitant

英 [ɪn'hæbɪtənt] 美 [ɪn'hæbɪtənt]

- n. 居民; 居住者

settlement

英 ['setlmənt] 美 ['setlmənt]

- n. 解决, 处理; [会计] 结算; 沉降; 殖民

批注 [46]: joint

英 [dʒɔɪnt] 美 [dʒɔɪnt]

- adj. 联合的, 合办的; 共同拥有的; 连带的; 连接的

- n. 关节; **接缝; 接合处, 接合点**; (牛, 羊等的腿)大块肉; (非正式)娱乐场所; (非正式)大麻烟卷; (电影或音乐的)创意作品

- v. 连接, 贴合, 接合; 使有接头; 把(动物)切成大块肉

批注 [47]: produce lower yields

yields

生产低收益率

water that **has been present for** several thousand years. These aquifers became **saturated** more than 10,000 years ago and are no longer being recharged.

批注 [48]: **has been present for**

已存在多年。

地下水一般贮存于岩石孔隙、节理、松散沉积物或者断裂和风化作用形成的孔洞。富含水的岩石或沉积物被称为“蓄水层”。因为沉积岩多孔，比如砂岩和砾岩，都是地下水的重要潜在源头。只要节理和裂缝扩大形成容器，石灰岩中也能够储存大量水资源。大部分石灰岩和砂岩蓄水层深广，但是储存的水资源不可再生。大多数沙石中较浅的蓄水层**贮水量少**，但可以迅速再生。一些深层地下水被称作“化石水”。用“化石”来形容水，这就意味着这些水已经存在了千年之久。这些蓄水层注满水起码已经 1 万年以上了，而其无法再生。

批注 [49]: **saturate**

英 ['sætʃəreɪt] 美 ['sætʃəreɪt]

•vt. 浸透，使湿透；使饱和，使充满

•adj. 浸透的，饱和的；深颜色的

Water does not remain immobile in an aquifer but can **seep out** at springs or leak into other aquifers. The rate of movement may be very slow: in the Indus plain, the movement of **saline** (salty) groundwaters has still not reached **equilibrium** after 70 years of **being tapped**. The mineral content of groundwater normally increases with the depth, but even quite shallow aquifers can be highly saline.

批注 [50]: **seep out**

[si:p aʊt]

•漏出

批注 [51]: **saline**

英 ['seɪlɪn] 美 ['seɪlɪn]

•adj. 盐的，含盐的；咸的；含氯化钠的；含镁盐类的；含碱金属盐类的

•n. 盐溶液；生理盐水

贮存在蓄水层的水并非不流动，而是会通过泉眼**渗出**或是进入其他蓄水层，可以流动水的比例可能很低：在印度河平原，流动的**含盐**地下水在**开采**了 70 年之后依旧不能达到**平衡**。正常情况下，地下水的矿物含量随着深度的增加而增加，但是即使很浅的蓄水层中可能含盐量也很高。

批注 [52]: **equilibrium**

英 [i:kwɪ'ɪbrɪəm; ,ekwɪ'ɪbrɪəm] 美 [i:kwɪ'ɪbrɪəm, ekwɪ'ɪbrɪəm]

•n. 均衡；平静；保持平衡的能力

阿特拉斯山脉（阿尔卑斯山系的一部分）

节理 (**joints** of rocks): 岩石中的裂隙，其两侧岩石没有明显的位移。地壳上部岩石中最广泛发育的一种断裂构造。

批注 [53]: **tap**

英 [tæp] 美 [tæp]

•v. 轻敲；装上嘴子；窃听；采用；在树上切口；委任；非法劝说转会

•n. 水龙头；阀门；轻打；窃听；踢踏舞；熄灯号；葬礼号

批注 [54]: **joint**

英 [dʒɔɪnt] 美 [dʒɔɪnt]

•adj. 联合的，合办的；共同拥有的；连带的；连接的

•n. 关节；**接缝；接合处，接合点**；（牛，羊等的腿）大块肉；（非正式）娱乐场所；（非正式）大麻烟卷；（电影或音乐的）创意作品