

TPO 49 – 1 Ancient Coastlines 古海岸线

Information on past climates is **of primary relevance** to archaeology because of what it tells us about the effects on the land and on the resources that people needed to survive. The most crucial **effect** of climate was on the **sheer*** quantity of land available in each period, measurable by studying **ancient coastlines**. These have changed constantly through time, even in relatively recent periods, as can be seen from the **Neolithic** stone circle of Er Lannic, in Brittany, France (once inland but now half **submerged** on an island) or medieval villages in east Yorkshire, England, that have **tumbled into** the sea in the last few centuries as the North Sea **gnaws its way westward** and **erodes** the cliffs. Conversely, silts deposited **by** rivers sometimes **push** the sea **farther back**, creating new land, as at Ephesus in western Turkey, a **port** on the **coast** in Roman times but today some five kilometers inland.

过去的气候信息和考古学有着密切的关联，因为这些信息告诉我们气候对人类生存所需的土地和资源产生的影响。气候最关键的影响是对于各个时期可使用土地的数量，这可以通过研究**古海岸线**来测算。即使是相对较近的年代，海岸线也一直在不断地改变着，这可以从法国布列塔尼地区的 Er Lannic 的新石器时代的巨石阵得到证实（曾经是内陆，现在半埋在一个岛上）；也可以从英国东约克郡中世纪的村庄得到证实，在过去的几个世纪里，随着北海一路**向西侵入**并侵蚀悬崖，这个村庄已**没入**大海。相反，沉积在河流**旁**的淤泥有时会将大海**推回到更远的**地方，创造出新的土地，这就和土耳其西部以弗所一样，（这个地方）在古罗马时代是一个**港口海岸**，但今天位于距离海洋约 5 公里的内陆。

Nevertheless, for **archaeologists** concerned with the long periods of time of the **Paleolithic** period there are variations in coastlines of much greater magnitude to consider. The expansion and contraction of the continental glaciers caused huge and uneven rises and falls in sea levels worldwide. When the ice sheets grew, the sea level would drop as water **became locked up in** the glaciers; when the ice melted, the sea level would rise again. Falls in sea level often exposed a number of important **land bridges**, such as those linking Alaska to northeast Asia and Britain to northwest Europe, a phenomenon **with far-reaching effects** not only **on** human colonization of the globe but also **on** the environment **as a whole**—the flora and fauna of **isolated** or **insular** areas were **radically** and often **irreversibly** affected. **Between Alaska and Asia today lies** the Bering Strait, which is so shallow that a fall in sea level of only four meters would turn it into a land bridge. When the ice sheets were at their greatest extent some 18,000 years ago (the glacier maximum), it is thought that the fall was about 120 meters, which therefore created **not merely** a bridge but a vast **plain**, 1,000 kilometers from the north to the south, which has been called **Beringia**. The existence of Beringia (and the extent to which it could have supported human life) is **one of the crucial pieces of evidence** in the **continuing debate** about the likely route and date of human colonization of the New World.

然而，对于那些关注漫长的旧石器时代的考古学家来说，他们需要研究的海岸线有着更大的变化性。大陆冰川的膨胀和收缩引起全球海平面巨大且不平稳地上升和下降。当冰盖增长，海平面就会下降，这是因为水**被封锁在**冰川内；当冰融化，海平面会再次上升。当海平面下降时，一些重要的陆桥会暴露出来，比如连接阿拉斯加与亚洲东北部的陆桥，以及连接英国和西

批注 | 1]: is **of primary relevance** to
和...密切相关
is relevant to
与...相关

批注 | 2]: **sheer*** quantity
•绝对数量

批注 | 3]: submerge
•vt. 淹没；把...浸入；沉浸
•vi. 淹没；潜入水中；湮没

批注 | 4]: tumble
•vi. 摔倒；倒塌；滚动；打滚；仓惶地行动
•vt. 使摔倒；使滚翻；弄乱
•n. 跌倒；翻筋斗；摔跤

批注 | 5]: isolated
•adj. 偏远的；孤立的；孤独的；单独的；绝缘的
•v. 使.....孤立；使.....分离；将.....剔出（isolate 的过去式和过去分词）

批注 | 6]: insular
英 ['ɪnsjələ] 美 ['ɪnsələr]
•adj. 孤立的；与世隔绝的；海岛的；岛民的

批注 | 7]: radically
英 ['rædɪkli] 美 ['rædɪkli]
•adv. 根本上；彻底地；以激进的方式

批注 | 8]: irreversibly
英 [ɪrɪ'vɜːsəbli] 美 [ɪrɪ'vɜːrsəbli]
•adv. 不可逆地

北部欧洲的陆桥，这一现象不仅对人类的殖民，而且对整个环境都有着深远的影响——对于孤立或隔绝区域的植物群或动物群有着彻底的不可逆的影响。如今，在阿拉斯加和亚洲之间的是白令海峡，这个海峡很浅，只需要四米的海平面下降就可以把它变成一个陆桥。大约 18000 年前，当冰盖达到巅峰（冰川最大化），（人们推断）当时海平面下降大约有 120 米，因此创造的不仅仅是一个桥，而是一个广阔的平原，从北到南 1000 公里，被称为白令陆桥。对于人类殖民新大陆的可能路径和可能日期的争论来说，白令陆桥的存在（以及它可以支持人类生存的程度），是至关重要的依据。

The assessment of past rises and falls in sea level requires study of submerged land surfaces off the coast and of raised or elevated beaches on land. Raised beaches are remnants of former coastlines at higher levels relative to the present shoreline and visible, for instance, along the Californian coast north of San Francisco. The height of a raised beach above the present shoreline, however, does not generally give a straightforward indication of the height of a former sea level. In the majority of cases, the beaches lie at a higher level because the land has been raised up through isostatic uplift or tectonic movement. Isostatic uplift of the land occurs when the weight of ice is removed as temperatures rise, as at the end of an ice age; it has affected coastlines, for example, in Scandinavia, Scotland, Alaska, and Newfoundland during the postglacial period. Tectonic movements involve displacements in the plates that make up Earth's crust. Middle and Late Pleistocene raised beaches in the Mediterranean are one instance of such movements.

针对过去海平面上升和下降的估算，是需要通过研究沿海下沉地表以及陆地上上升的海滩来实现的。海滩高地是相较于现在的海岸线来说，过去较高海岸线的遗迹，例如，旧金山北部的加利福尼亚海岸就可以看得见。但是，现在沿海地带上的海滩高地的高度，并不能为过去海平面的高度（估算）提供直接的线索。在大多数情况下，海滩高地是陆地通过均衡隆起或地壳运动而抬升的。随着温度上升，当冰块重量减轻，比如在某个冰河时期末期，土地的均衡隆起就会发生；它对冰河时期后的斯堪的纳维亚、苏格兰、阿拉斯加和纽芬兰岛海岸线都产生了影响。地壳运动是构成地球地壳的板块的移动。更新世中晚期的海滩高地是这种运动的一个实例。

Raised beaches often consist of areas of sand, pebbles, or dunes, sometimes containing seashells or piles of debris comprising shells and bones of marine animals used by humans. In Tokyo Bay, for example, shell mounds of the Jomon period (about 10,000 to 300 B.C.E.) mark the position of the shoreline at a time of maximum inundation by the sea (6,500-5,500 years ago), when, through tectonic movement, the sea was three to five meters higher in relation to the contemporary landmass* of Japan than at present. Analysis of the shells themselves has confirmed the changes in marine topography, for it is only during the maximum phase that subtropical species of mollusc are present, indicating a higher water temperature.

海滩高地通常由含有沙地、卵石、或沙丘的地区构成，有时（这些区域）还包含贝壳或者碎片堆，包括贝壳和被人类使用过后的海洋动物的骨头。例如，在东京湾，绳纹时代的贝冢（约公元前 10000 至 300 年）标记了被海水淹没的最高的海岸线位置（6500-5500 年前），当时通过地壳运动，海平面比现在的日本陆地高出三米到五米。对贝壳的分析证实了海洋地势的改变，因为只有当海平面达到最高水平时，亚热带的软体动物才出现，这表明了（当时）较高的水温。

批注 [9]: isostatic

英 [ˌaɪsəʊ'stætɪk]

•adj. 均衡说的；[地物] 地壳均衡的

批注 [10]: uplift

•v. 抬起，举起；振奋，鼓舞；捡起

•n. 提高，增长；振奋，精神动力；（地壳的）隆起；举起，抬起；（尤指女服的）胸衬

批注 [11]: Pleistocene

英美 ['plaɪstəːsiːn]

•adj. 更新世的

•n. 更新世；更新世岩

批注 [12]: mound

•n. 堆；高地；坟堆；护堤

•vt. 堆起；筑堤

•vi. 积成堆

批注 [13]: inundation

•n. 洪水；泛滥

批注 [14]: in relation to

•关于；涉及

批注 [15]: landmass*

•n. 大陆

TPO 49 – 2 Movable Type 活字印刷

Nothing divided the medieval world in Europe more decisively from the Early Modern period than printing with movable type. It was a German invention and the culmination of a complex process. The world of antiquity had recorded its writings mainly on papyrus. Between 200 B.C and A.D 300, this was supplemented by vellum, calf skin treated and then smoothed by pumice stone. To this in late Roman times was added parchment, similarly made from the smoothed skin of sheep or goats. In the early Middle Ages, Europe imported an industrial process from China, which turned almost any kind of fibrous material into pulp that was then spread in sheets. This was known as cloth parchment. By about 1150 the Spanish had developed the first mill for making cheap paper (a word contracted from "papyrus", which became the standard term). One of the most important phenomena of the later Middle Ages was the growing availability of cheap paper. Even in England, where technology lagged far behind, a sheet of paper, or eight octavo pages, cost only a penny by the fifteenth century.

没有什么比活字印刷更能够将中世纪的欧洲和近代早期划分开来。这是德国的发明，并且是复杂加工的巅峰。古时主要在纸莎草纸上记录作品。公元前 200 年到公元 300 年之间，还增加了牛皮纸（作为书写材料）——小牛皮经过加工，用浮石将其变平整。在这基础之上，在罗马时代晚期，又增加了羊皮纸，同样由光滑的绵羊或山羊皮制成。在中世纪早期，欧洲从中国进口工业方法，将几乎任何一种纤维材料变成浆，然后铺成片状。这被称为布羊皮纸。在大约 1150 年，西班牙已经建立了制造廉价纸的第一个工厂（paper 是 papyrus 的缩写，现在已经变成了标准术语）。中世纪后期最重要的现象之一就是廉价纸张的日益普及。即使是在技术远远落后的英国，一张纸或八开纸，到十五世纪时都只要一分钱。

In the years 1446-1448, two German goldsmiths, Johannes Gutenberg and Johann Fust, made use of cheap paper to introduce a critical improvement in the way written pages were reproduced. Printing from wooden blocks was the old method; what the Germans did was to invent movable type for the letterpress. It had three merits: it could be used repeatedly until worn out; it was cast in metal from a mold and so could be renewed without difficulty; and it made lettering uniform. In 1450, Gutenberg began work on his Bible, the first printed book, known as the Gutenberg. It was completed in 1455 and is a marvel. As Gutenberg, apart from getting the key idea, had to solve a lot of practical problems, including imposing paper and ink into the process and the actual printing itself, for which he adapted the screw press used by winemakers, it is amazing that his first product does not look at all rudimentary. Those who handle it are struck by its clarity and quality.

在 1446-1448 年间，两个德国金匠约翰内斯·古腾堡和约翰·福斯特，利用廉价的纸张，在纸张再利用方面做出了重要的改进。木版印刷是过去的方法；德国人所做的是发明活版印刷。它有三个优点：它在磨损之前可以反复使用；它是用磨具铸造成金属（模块），所以很容易被重新利用；它使文字（样式）统一。在 1450，古腾堡开始着手于印刷圣经，第一本印刷的书被称作《古腾堡（圣经）》。它在 1455 年完成，并且是一个杰作。除了获取关键的灵感，古腾堡需要解决很多实际问题，包括在生产和实际印刷过程中将纸张和油墨装板，他改良了酿酒师的螺旋压力机，而令人吃惊的是，他的第一个产品看上去并不粗糙。接触过他第一个产品的人都震惊于其清晰和质量。

Printing was one of those technical revolutions that developed its own momentum at extraordinary speed. Europe in the fifteenth century was a place where intermediate technology—that is, workshops with skilled craftspeople—was well established and spreading fast, especially in Germany and Italy. Such workshops were able to take on printing easily, and it thus became Europe's first true industry. The process was aided by two factors: the new demand for cheap classical texts and the translation of the Latin Bible into "modern" languages. Works of reference were also in demand. Presses sprang up in several German cities, and by 1470, Nuremberg, Germany had established itself as the center of the international publishing trade, printing books from 24 presses and distributing them at trade fairs all over western and central Europe. The old monastic scriptoria—monastery workshops where monks copied texts by hand—worked closely alongside the new presses, continuing to produce the luxury goods that movable-type printing could not yet supply. Printing, however, was primarily aimed at a cheap mass sale.

印刷术是一种技术革命，它以非凡的速度发展。在十五世纪的欧洲，媒介工艺（指的是拥有高技术工匠的工作室）发展的很好并且迅速蔓延，尤其是在德国和意大利。这样的工作室能够很容易地开展印刷，从而成为欧洲第一个真正的产业。这个发展得益于两个因素：对于廉价经典文本的新需求，以及将拉丁文的《圣经》翻译成“现代”语言的需求。参考文献也有需求。出版社在德国的几个城市中涌现出来，并且截至 1470 年底，德国纽伦堡成为国际出版业的中心，印刷来自 24 家出版社的书籍，并且通过商品交易会，将这些书籍分发到西欧和中欧国家。古老的寺院缮写室（修道院工作室，在这里和尚通过手抄复制书籍）和出版社共存，继续生产奢侈制品，继续提供活字印刷无法供应的制品。但是，印刷，主要是针对廉价的大规模销售。

Although there was no competition between the technologies, there was rivalry between nations. The Italians made energetic and successful efforts to catch up with Germany. Their most successful scriptorium quickly imported two leading German printers to set up presses in their book-producing shop. German printers had the disadvantage of working with the complex typeface that the Italians sneeringly referred to as "Gothic" and that later became known as black letter. Outside Germany, readers found this typeface disagreeable. The Italians, on the other hand, had a clear typeface known as roman that became the type of the future.

虽然这些技术之间没有竞争，但国家之间存在着竞争。意大利费尽心力，成功地赶上了德国。意大利最成功的写字间迅速引入两台德国领先的印刷机，装配在他们的书籍制作车间。德国打印机的缺点是需要处理复杂的字形，这被意大利人轻蔑地称为“哥特式”，后来（这些字体）被称为黑体字。在德国以外，这种字体读起来令人感觉不适。与之形成对比的是，意大利人有一个清晰的字体被称为“罗马字体”，而这种字体成为未来的主流。

Hence, although the Germans made use of the paper revolution to introduce movable type, the Italians went far to regain the initiative by their artistry. By 1500 there were printing firms in 60 German cities, but there were 150 presses in Venice alone. However, since many nations and governments wanted their own presses, the trade quickly became international.

The cumulative impact of this industrial spread was spectacular. Before printing, only the very largest libraries, of which there were a dozen in Europe, had as many as 600 books. The total number of books on the entire Continent was well under 100,000. But by 1500, after only 45 years of the printed book, there were 9 million in circulation.

因此，尽管德国人利用纸张革命引进了活字印刷术，意大利人却以其艺术性获得了主动性。截至 1500 年，在德国的 60 个城市有印刷公司，但仅在威尼斯就有了 150 家印刷厂。然而，由于许多国家和政府希望拥有自己的印刷厂，该行业迅速地国际化。这种产业持续扩张的影响是可观的。在印刷术出现之前，只有最大的图书馆，其中一大部分在欧洲，才可能拥有 600 本书籍。整个大陆的书籍总数远低于 10 万册。但到了 1500 年，在印刷书籍出现 45 年后，发行量达到了 900 万册。

TPO 49 – 3 Background for the Industrial Revolution

工业革命的背景

The Industrial Revolution had several roots, one of which was a commercial revolution that, beginning as far back as the sixteenth century, accompanied Europe's expansion overseas. Both exports and imports showed spectacular growth, particularly in England and France. An increasingly larger portion of the stepped-up commercial activity was the result of trade with overseas colonies. Imports included a variety of new beverages, spices, and ship's goods around the world and brought money flowing back. Europe's economic institutions, particularly those in England, were strong, had wealth available for new investment, and seemed almost to be waiting for some technological breakthrough that would expand their profit-making potential even more.

工业革命有几个根源，其中之一就是商业革命，商业革命早在十六世纪就已经发起，它伴随着欧洲在海外的扩张。出口和进口都表现出惊人的增长，特别是在英国和法国。在强化的商业活动中，越来越多的活动开展是由于与海外殖民地进行贸易而发生的。进口的商品包括世界各地的多种新款饮料、香料和船舶物资，并带来资金回流。欧洲的经济机构，尤其那些在英国的（机构），都很强大，对于新的投资有着足够的资金，似乎在等待一些技术上的突破，从而进一步扩大其可获得的利益。

The breakthrough came in Great Britain, where several economic advantages created a climate especially favorable to the encouragement of new technology. One was its geographic location at the crossroads of international trade. Internally, Britain was endowed with easily navigable natural waterway, which helped its trade and communication with the world. Beginning in the 1770's, it enjoyed a boom in canal building, which helped make its domestic market more accessible. Because water transportation was the cheapest means of carrying goods to market, canals reduced prices and thus increased consumer demand. Great Britain also had rich deposits of coal that fed the factories springing up in industrial and consumer goods.

这一突破出现在英国，在那里有一些经济上的有利条件，营造了有益于新科技发展的氛围。第一个有利条件是：它地处国际贸易中关键的地理位置。从内部来说，英国有着易于航行的自然水道，这有助于它与世界各地进行贸易和沟通。从18世纪70年代开始，英国迎来了运河建设的繁荣时期，这使得它的国内市场更加便利。由于水路运输是运送货物到市场的最廉价的途径，运河降低了商品价格，从而增加了消费者的需求。英国还拥有丰富的煤炭储量，这些滋养了在工业和消费品行业中涌现的工厂。

Another advantage was Britain's large population of rural, agricultural wage earners, as well as cottage workers, who had the potential of being more mobile than peasants of some other countries. Eventually they found their way to the cities or mining communities and provided the human power upon which the Industrial Revolution was built. The British people were also consumers; the absence of internal tariffs, such as those that existed in France or Italy or between the German states, made Britain the largest free-trade area in Europe. Britain's relatively stable government also helped create an atmosphere conducive to industrial progress.

另一个优势是：英国有着大量的以务农为生的工薪阶层以及农业工人，他们比其他国家的农民更具有流动性。最终，他们找到了通往城市或采矿社区的道路，并为工业革命建设提供了人力。英国人也是消费者；没有关税（比如在法国或是在意大利，亦或是在德国各州之间存在的关税）使其成为了欧洲最大的自由贸易区。英国相对稳定的政府也有助于创造一个有利于工业进步的氛围。

Great Britain's better-developed banking and credit system also helped speed the industrial progress, as did the fact that it was the home of an impressive array of entrepreneurs and inventors. Among them were a large number of nonconformists whose religious principles encouraged thrift and industry rather than luxurious living and who tended to pour their profits back into their business, thus providing the basis for continued expansion.

英国发达的银行和信贷体系也促进了工业的进步，事实上，这是一个杰出企业家和发明家的发源地。其中，有大量的异教徒，他们的宗教原则鼓励节俭和勤勉，而不是奢侈的生活，他们往往把利润回流到他们的业务中，从而为持续扩展提供基础。

A precursor to the Industrial Revolution was a revolution in agricultural techniques. Ideas about agricultural reform developed first in Holland, where as early as the mid-seventeenth century, such modern methods as crop rotation, heavy fertilization, and diversification were all in use. Dutch peasant farmers were known throughout Europe for their agricultural innovations, but as British markets and opportunities grew, the English quickly learned from them. As early as the seventeenth century the Dutch were helping them drain marshes and fens where, with the help of advanced techniques, they grew new crops. By the mid-eighteenth century new agricultural methods as well as selective breeding of livestock had caught on throughout the country.

工业革命的先驱是农业技术革命。早在十七世纪中叶，农业改革的思想首先在荷兰发展起来，轮作、重施肥法以及农作物多样化等现代方法都被使用。荷兰农民在欧洲以农业创新而闻名，但随着英国市场的发展和机会的增长，英国人很快就学会了他们的技术。早在十七世纪，荷兰人就帮助英国人排干沼泽，在这里，他们利用先进的技术种植新作物。到十八世纪中叶，全国各地开始流行新的农业方法和家畜的选择性育种。

Much of the increased production was consumed by Great Britain's burgeoning population. At the same time, people were moving to the city, partly because of the enclosure movement; that is, the fencing of common fields and pastures in order to provide more compact, efficient privately held agricultural parcels that would produce more goods and greater profits. In the sixteenth century enclosures were usually used for creating sheep pastures, but by the eighteenth century new farming techniques made it advantageous for large landowners to seek enclosures in order to improve agricultural production. Between 1714 and 1820 over 6 million acres of English land were enclosed. As a result, many small, independent farmers were forced to sell out simply because they could not compete. Non-landholding peasants and cottage workers, who worked for wages and grazed cows or pigs on the village common, were also hurt when the common was no longer available. It was such people who began to flock to the cities seeking employment and who found work in the factories that would

transform the nation and, the world.

大部分增加的产量被英国增长的人口所消耗。同时，人们搬到城市，这在一定程度上是因为圈地运动造成的：（圈地运动）所指的是，将公共耕地和牧场圈起，以提供更紧凑、更高效率的私人持有的农业土地，这将有利于生产更多的商品，并创造更大的利润。在十六世纪的圈地通常用于创建绵羊牧场，但到了十八世纪，新的农业技术有利于大地主通过圈地来提高农业生产。在 1714 年和 1820 年之间，超过 600 万英亩的英国土地被圈起。结果，许多小的独立农民被迫出让土地，因为他们无法（与大地主）竞争。未持有土地的农民和工人，依靠在农村公共土地上养牛养猪来获得收入，当公共土地不再可以使用时，他们的利益也受到了损害。正是这些开始涌向城市找工作的人，在工厂找到工作的人，将会改变国家和世界。