

A recent study has provided clues to predator-prey dynamics in the late Pleistocene era. Researchers compared the number of tooth fractures in carnivores that lived 36,000 to 10,000 years ago and that were preserved in the Rancho La Brea tar pits in Los Angeles. The breakage frequencies in the extinct species were strikingly higher than those in the present-day species.

In considering possible explanations for this finding, the researchers dismissed demographic bias because older individuals were not overrepresented in the fossil samples. They rejected preservational bias because a total absence of breakage in two extinct species demonstrated that the fractures were not the result of abrasion within the pits. They ruled out local bias because breakage data obtained from other Pleistocene sites were similar to the La Brea data. The explanation they consider most plausible is behavioral differences between extinct and present-day carnivores—in particular, more contact between the teeth of predators and the bones of prey due to more thorough consumption of carcasses by the extinct species. Such thorough carcass consumption implies to the researchers either that prey availability was low, at least seasonally, or that there was intense competition over kills and a high rate of carcass theft due to relatively high predator densities.

近期的一项研究为更新世后期食肉动物的捕食动态提供了线索。就食肉动物牙齿的磨损情况，研究者在现今食肉动物和生活在 3600 到 10000 年前的食肉动物（遗存于洛杉矶的拉布雷亚牧场沥青坑中）之间做了对比。这些已灭绝物种的牙齿破损发生率要明显高于现存物种。在考虑对这一发现各种可能的解释时，研究者排除了统计偏差，因为年老个体没有过多占据化石样本总体。排除了可能因保存不当造成的偏差，因为两个完全没有破损的灭绝物种化石表明磨损不是由坑中的摩擦造成的。排除了地域性偏差，因为从其它更新世发掘地获得的数据与拉布雷亚的数据相近。而后研究者得出了他们认为最合理的解释——是因为灭绝物种和现存物种行为上的差异，尤其是由于已灭绝捕食者对猎物更彻底的啃食，使其牙齿与猎物骨头有更多的接触。研究者由这种彻底的啃食行为推断，不是猎物太少（至少是季节性的），就是捕食者太多，以致猎杀时有激烈的竞争和频繁的猎物盗取。

Ecoefficiency (measures to minimize environmental impact through the reduction or elimination of waste from production processes) has become a goal for companies worldwide, with many realizing significant cost savings from such innovation. Peter Senge and Ganor Carstedt see this development as laudable but suggest that simply adopting ecoefficiency innovation could actually worsen environmental stresses in the future. Such innovations reduce production waste but do not alter the number of products manufactured nor the waste generated from their use and discard; indeed, most companies invest in ecoefficiency improvements in order to increase profits and growth. Moreover, there is no guarantee that increased economic growth from ecoefficiency will come in similarly ecoefficient ways, since in today's global

markets, greater profits may be turned in old-style eco-inefficient industries. Even a vastly more ecoefficient industrial system could, were it to grow much larger, generate more total waste and destroy more habitat and species than would a smaller, less ecoefficient economy. Senge and Carstedt argue that to preserve the global environment and sustain economic growth businesses must develop a new systemic approach that reduces total material use and total accumulated waste. Focusing exclusively on ecoefficiency, which offers a compelling business case according to established thinking, may distract companies from pursuing radically different products and business models.

提高生态效率(通过减少或消除生产过程中产生的废物以最大限度地减小其对环境影响的措施)已成为全世界公司的目标。许多公司通过这一革新实现了明显的开销缩减。Peter Senge 和 Ganor Carstedt 认为这一发展是值得称赞的,但是仅仅采取这种技术革新实际上会加重未来的环境压力。这种革新虽然减少了生产废料,但是并没有改变产品的生产数量以及使用和丢弃产品的数量。再者,也不能保证因提高生态效率获得的经济增长会以同样的方式推行,因为在现今国际市场,更多的收益可能会转变成投资资本,很容易再次投入老式的无生态效率的产业。甚至生态效率更高的生产体系在扩大后也会产生出更多的废弃物,破坏更多的栖息地,危害更多的物种。Senge 和 Carstedt 认为要想保护世界环境同时又保持经济增长,企业必须运用一种能减少材料使用总量和废料积累总量的系统性方法。现有的生态效率的理念提出了一种吸引人的商业方案,但仅关注与这一点会妨碍公司追求不同的产品和商业模式。

3

Traditionally, the first firm to commercialize a new technology has benefited from the unique opportunity to shape product definitions, forcing followers to adapt to a standard or invest in an unproven alternative. Today, however, the largest payoffs may go to companies that lead in developing integrated approaches for successful mass production and distribution.

Producers of the Beta format for videocassette recorders (VCRs), for example, were first to develop the VCR commercially in 1975, but producers of the rival VHS (Video Home System) format proved to be more successful at forming strategic alliances with other producers were reluctant to form such alliances and eventually lost ground to VHS in the competition for the global VCR market.

Despite Beta's substantial technological head start and the fact that VHS was neither technically better nor cheaper than Beta, developers of VHS quickly turned a slight early lead in sales into a dominant position. Strategic alignments with producers of prerecorded tapes reinforced the VHS format further expanded VHS's share of the market. By the end of the 1980s, beta was no longer in production.

按照惯例,第一个把新技术商业化的公司会从中获益,因为只有这一公司有机会给新产品下定义。这将迫使其仿效者适应这一规范产品或投资另一种未经检验的替代品。但是今天,只有那些以批量生产经销为目的,领先发展综合方法的公司才可能获得最大的收益。

例如，1975 年，Bata 录影带的生产商首次将他们的产品商业化，结果获得更大成功的却是其对手 VHS 录影带的生产商，因为他们与其他生产商和经销商建立战略性联盟来生产和销售他们的产品。然而，Bata 录影带生产商为了继续独霸录影带的销售，对这种联盟的建立犹豫不决，最终在全球录影带市场的竞争下失去了一席之地。

Bata 以价值巨大的技术占领先机，VHS 在技术上不比 Bata 强，在价格上也不便宜，然而 VHS 很快在重要领域的销售上略有领先。与磁带生产商的战略性联盟加强了 VHS 的优势。消费者认为 VHS 格式的磁带更容易买到，这也使得 VHS 获得了更大的市场份额。到 80 年代末，Bata 已经停产了。

4

During the 1960s and 1970s, the primary economic development strategy of local governments in the United States was to attract manufacturing industries. Unfortunately, this strategy was usually implemented at another community's expense: many manufacturing facilities were lured away from their moorings elsewhere through tax incentives and slick promotional efforts. Through the transfer of jobs and related revenues that resulted from this practice, one town's triumph could become another town's tragedy.

On the 1980s the strategy shifted from this zero-sum game to one called "high-technology development," in which local governments competed to attract newly formed high-technology manufacturing firms. Although this approach was preferable to victimizing other geographical areas by taking their jobs, it also had its shortcomings: high-tech manufacturing firms employ only a specially trained fraction of the manufacturing workforce, and there simply are not enough high-tech firms to satisfy all geographic areas.

Recently, local governments have increasingly come to recognize the advantages of yet a third strategy; the promotion of homegrown small businesses. Small indigenous businesses are created by a nearly ubiquitous resource, local entrepreneurs. With roots in their communities, these individuals are less likely to be enticed away by incentives offered by another community. Indigenous industry and talent are kept at home, creating an environment that both provides jobs and fosters further entrepreneurship.

二十世纪六七十年代，美国地方政府主要的经济发展策略是吸引制造业。而这一策略的实施使其它地区付出代价。由于税收刺激和促销努力许多生产设备被转移到了其他地方。由此带来的职业转变和相关财政收益使得一个市镇的成功可能成为另一个城镇的不幸。

在八十年代，政府战略从以前的零和对策变成所谓的“高科技发展”策略——当地政府争相吸引新成立的高科技生产公司。虽然这种方法比夺取其它地域工作使其利益受到损害的方法更可取，它还是有缺点的。高科技生产公司只雇佣那些经过特殊培训的生产工人，并且没有足够多的高科技生产公司来满足所有地域的需求。

最近，地方政府日渐意识到第三种策略——推广本地小型企业——的优势。小型当地企业由当地企业家建立，拥有近乎无所不在的资源。这些企业家植根于自己所在的地区中不太可能

被其它地区吸引走。当地的产业和人才都被留住了，这为工作岗位的提供以及未来企业家的培养创建了环境。

5

In 1988 services moved ahead of manufacturing as the main product of the United States economy. But what is meant by “services”? Some economists define a service as something that is produced and consumed simultaneously, for example, a haircut. The broader, classical definition is that a service is an intangible something that cannot be touched or stored. Yet electric utilities can store energy, and computer programmers save information electronically. Thus, the classical definition is hard to sustain.

The United States government’s definition is more practical: services are the residual category that includes everything that is not agriculture or industry. Under this definition, services include activities as diverse as engineering and driving a bus. However, besides lacking a strong conceptual framework, this definition falls to recognize the distinction between service industries and service occupations. It categorizes workers based on their company’s final product rather than on the actual work the employees perform. Thus, the many service workers employed by manufacturers—bookkeepers or janitors, for example—would fall under the industrial rather than the services category. Such ambiguities reveal the arbitrariness of this definition and suggest that, although practical for government purposes, it does not accurately reflect the composition of the current United States economy.

1988年，服务业超过制造业成为美国经济的首要产业。但是“服务”是指什么？一些经济学家把服务定义成生产和消费同时进行的行爲，例如理发。更宽泛些，服务传统上是指无形的，摸不着的，不能储存的东西。可是电力设施可以储存能量，电脑程序可以保存电子信息。所以传统上的定义很难成立。

美国政府下的定义要更实际些。服务业是指除农业和工业外的其它所有行业。但是这个定义除了缺少概念上的结构，还无法区分服务性产业和服务性职业的差别。这个定义以雇员所在公司的最终产品为标准将雇员分类，而不是以雇员的实际工作为标准。这样，那些在工厂从事服务业的雇员（如图书管理员，门卫）就会被划分到工业类而不是服务业。由此表明，这一定义不仅模棱两可、主观武断，还不能真实地反映美国当今的经济结构，尽管它对于政府目的而言是实际可行的。

6

Current feminist theory, in validating women’s own stories of their experience, has encouraged scholars of women’s history to view the use of women’s oral narratives as the methodology, next to the use of women’s written autobiography, that brings historians closest to the “reality” of women’s lives. Such narratives, unlike most standard histories, represent experience from the perspective of women, affirm

the importance of women's contributions, and furnish present-day women with historical continuity that is essential to their identity, individually and collectively.

Scholars of women's history should, however, be as cautious about accepting oral narratives at face value as they already are about written memories. Oral narratives are no more likely than are written narratives to provide a disinterested commentary on events or people. Moreover, the stories people tell to explain themselves are shaped by narrative devices and storytelling conventions, as well as by other cultural and historical factors, in ways that the storytellers may be unaware of. The political rhetoric of a particular era, may influence women's interpretations of the significance of their experience. Thus a woman who views the Second World War as pivotal in increasing the social acceptance of women's paid work outside the home may teach that conclusion partly and unwittingly because of war Time rhetoric encouraging a positive view of women's participation in such work.

女性传记能使历史学家最大限度地接近女性生活的实质。当今的女权主义理论鼓励了从事女性历史研究的学者将女性的口头叙述当做仅次于传记的方法来证实女性自身经历故事。与大多数普通的故事不同，这种叙述是从女性观点出发的经历故事，申明了女性所作出贡献的重要性，还为当今女性作为个体和集体的身份提供了重要的历史性衔接。

但是，研究女性历史的学者应该注意不能像以往以表面价值接受“写下来的记忆”那样来接受口头叙述。口头叙述不像书面叙述那样客观地评价人或事，而且在人们讲述自己的故事时，可能会无意识受到叙述技巧，风俗习惯以及其它文化历史因素的影响。例如，某个特殊时期的政治言论可能会影响女性对自我经历意义的理解。如果一个女性把第二次世界大战看做引起社会越来越认可女性外出工作的关键性事件，她可能在一定程度上稀里糊涂地认为这是因为战时宣言鼓励女性参加这些工作。

7

In recent years, teachers of introductory courses in Asian American studies have been facing a dilemma nonexistent a few decades ago, when hardly any texts in that field were available. Today, excellent anthologies and other introductory texts exist, and books on general issues important for Asian American are published almost weekly. Even professors who are experts in the field find it difficult to decide which of these to assign to students; nonexperts who teach in related areas and are looking for writings for and by Asian American to include in survey courses are in an even worse position.

A complicating factor has been the continuing lack of specialized one-volume reference works on Asian American, such as biographical dictionaries or desktop encyclopedias. Such works would enable students taking Asian American studies courses (and professors in related fields) to look up basic information on Asian American individuals, institutions, history, and culture without having to wade through mountains of primary source material. In addition, given such works, Asian American studies professors might feel more free to include more

challenging Asian American material in their introductory reading lists, since good reference works allow students to acquire on their own the background information necessary to interpret difficult or unfamiliar material.

近年来,教授“亚裔美国人研究”基础课程的老师正处于进退两难的境地,这在几十年前是不存在的,那时,几乎还没有有关这一领域文章;现在,有优秀的作品集和其它入门性文章,几乎每周都有关于个别亚裔美国人团体和关于亚裔美国人普遍问题的书出版。然而即便专门研究这一领域的教授也觉得很难决定给学生指定阅读哪些文章。对于那些不从事这一领域研究却教授与此相关领域的教师或是为了做调查来查阅相关文章的人,这种境况就更糟了。

其中一个复杂的因素就是一直缺少有关亚裔美国人一卷式的专业性参考文献,例如生物学辞典或电子百科全书。有了这类文献,修“亚裔美国人研究”课程的学生(或相关专业的教师)就可以从中查找有关亚裔美国人个体、机构、历史和文化的信息,而不用去翻阅一堆堆山也似的入门资料。此外,有了这些文献,从事亚裔美国人研究的教授可能更乐于在入门书单中加入更富挑战性的书目。因为好的参考书可以帮助学生在遇到难度大或不熟悉的资料时自己查阅所需的背景知识。

8

In the seventeenth-century Florentine textile industry, women were employed primarily in low-paying, low-skill jobs, to explain this segregation of labor by gender, economists have relied on the useful theory, investment in human capital—the acquisition of difficult job-related skills—generally benefits individuals by making them eligible to engage in well-paid occupations. Women’s role as child bearers, however, results in interruptions in their participation in the job market (as compared with men’s) and thus reduces their opportunities to acquire training for highly skilled work. In addition, the human capital theory explains why there was a high concentration of women workers in certain low-skill jobs, such as weaving, but not in others, such as combing or carding, by positing that because of their primary responsibility in child rearing women took occupations that could be carried out in the home.

There were, however, differences in pay scales that cannot be explained by the human capital theory. For example, male constructions workers were paid significantly higher wages than female taffeta weavers. The wage difference between these two low-skill occupations stems from the segregation of labor by gender: because a limited number of occupations were open to women, there was a large supply of workers in their fields, and this “overcrowding” resulted in women receiving lower wages and men receiving higher wages.

在十七世纪佛罗伦萨的纺织业中,女性主要受雇于低收入低技能的工作。经济学家靠人力资本理论来解释这种劳动分配上的性别歧视。依据这一理论,在人力资本上的投入(获得与工作相关的有难度的技能)通常对个人有利,帮助他们获得从事高薪工作的技能。但是女性一直充当孩子抚养者的角色,这阻碍了她们加入就业市场(与男性相比)从而减少了她们获得高技能工作培训的机会。此外,人力资本理论解释了有大批女性集中于像纺织这种低技能工

作，而没有集中在梳理棉、毛这类同样是低技能的工作的原因，这是因为女性抚养孩子的主要责任迫使她们从事可以在家中完成的工作。

但是男女之间不同的工资差别却没法用人力资本理论来解释。例如，建筑工人（男）的工资明显高于塔夫绸纺织女工。这两种低技能工作的工资差距是源于劳动分配上的性别差异：因为只有有限的一部分职位是对女性开放的，而在这些领域有大量的应征者，这种“过度密集”导致女性获得较低的工资而男性获得较高的工资。

9

(This passage was adapted from an article written in 1992.)

Some observers have attributed the dramatic growth in temporary employment that occurred in the United States during the 1980s to increased participation in the workforce by certain groups, such as first-time or reentering workers, who supposedly prefer such arrangements. However, statistical analyses reveal that demographic changes in the workforce did not correlate with variations in the total number of temporary workers. Instead, these analyses suggest that factors affecting employers account for the rise in temporary employment. One factor is product demand: temporary employment is favored by employers who are adapting to fluctuating demand for products while at the same time seeking to reduce overall labor costs. Another factor is labor's reduced bargaining strength, which allows employers more control over the terms of employment. Given the analyses, which reveal that growth in temporary employment now far exceeds the level explainable by recent workforce entry rates of groups said to prefer temporary jobs, firms should be discouraged from creating excessive numbers of temporary positions. Government policymakers should consider mandating benefit coverage for temporary employees, promoting pay equity between temporary and permanent workers, assisting labor unions in organizing temporary workers, and encouraging firms to assign temporary jobs primarily to employees who explicitly indicate that preference.

一些观察者认为：八十年代美国临时性工作的突然增加是因为初进和再进工作岗位的人数增加。据说他们喜欢这种雇佣方式。然而数据分析显示，劳动人口统计数据的变化与从事临时性工作的总人数并没有相关性。一个原因是那些为适应产品需求不断波动的同时又想降低劳动力成本的雇主喜欢雇佣临时工人。另一个原因是雇员商讨力的减弱，这使雇主在雇佣问题上更有操纵权。以上分析表明：现在临时雇佣人数大为增加，已经远非喜欢这种雇佣方式的人的增加所能解释，应该阻止公司设立过多的临时职位。政府政策的制定者应该考虑保障临时雇员的利益，促进临时员工和长期员工的工资待遇平等，帮助工会组织临时雇员，并且鼓励公司将临时工作分配给那些真正喜欢临时工作的人。

10

In *Winters v. United States* (1908), the Supreme Court held that the right to use waters flowing through or adjacent to the Fort Belknap Indian Reservation was reserved to American Indians by the treaty establishing the reservation. Although

this treaty did not mention water rights, the Court ruled that the federal government, when it created the reservation, intended to deal fairly with American Indians by reserving for them the waters without which their lands would have been useless. Later decisions, citing *Winters*, established that courts can find federal rights to reserve water for particular purposes if (1) the land in question lies within an enclave under exclusive federal jurisdiction, (2) the land has been formally withdrawn from federal public lands—i.e., withdrawn from the stock of federal lands available for private use under federal land use laws—and set aside or reserved, and (3) the circumstances reveal the government intended to reserve water as well as land when establishing the reservation.

Some American Indians tribes have also established water rights through the courts based on their traditional diversion and use of certain waters prior to the United States' acquisition of sovereignty. For example, the Rio Grande pueblos already existed when the United States acquired sovereignty over New Mexico in 1848. Although they at that time became part of the United States, the pueblo lands never formally constituted a part of federal public lands; in any event, no treaty, statute, or executive order has ever designated or withdrawn the pueblos from public lands as American Indian reservations. This fact, however, has not barred application of the *Winters* doctrine. What constitutes an American Indian reservation is a question of practice, not of legal definition, and the pueblos have always been treated as reservations by the United States. This pragmatic approach is buttressed by *Arizona v. California* (1963), wherein the Supreme Court indicated that the manner in which any type of federal reservation is created does not affect the application to it of the *Winters* doctrine. Therefore, the reserved water rights of Pueblo Indians have priority over other citizens' water rights as of 1848, the year in which pueblos must be considered to have become reservations.

在 1908 年的美国温特斯法案中，最高法院认定，贝克纳城堡印第安人保留地的印第安人使用流经或邻近该保留地水源的权利受建立此保留地的协约保护。尽管协约没有提及用水权，但是经法院裁定认为，联邦政府在建立保留地时，意在公平地对待美国印第安人，如果没有用水权，保留的土地也就没有用了。援引温特斯法案，后来规定在以下三种情况下，法院可以裁定联邦有权利因特殊目的保留水源。1、争议土地位于联邦管辖的印第安保留地中，2、这片土地已经正式脱离联邦公共用地，成为联邦土地使用法保护下的私人用地或留作它用，3、政府在建立保留地的同时有意图保留用水权。

基于美国独立之前他们就在使用的原有分水渠，一些美国印第安部落也通过法院确立了用水权。例如普韦布洛印第安人聚居地在 1984 年美国获得新墨西哥州统治权之前就已存在，尽管普韦布洛在 1984 年成了美国领土的一部分，在普韦布洛从未建立过联邦公共用地；从没有协约、法令或行政命令指明将普韦布洛脱离联邦政府作为保留地。然而这些事实并不影响温特斯法案在普韦布洛的适用性。事实上建立保留地只是一个实际操作问题，而不是法律定义的问题，因为普韦布洛一向被政府视作保留地。这种实际操作在 1963 年 *Arizona VS California* 的案例中得到支持，在该案例中最高法院表示保留地是通过何种方式建立起来的并不影响温特斯法案对它的适用性。因此，从 1848 年起，即普韦布洛被认定为保留地的那一年开始，普韦布洛部落的人就享有优先用水权。

Many United States companies have, unfortunately, made the search for legal protection from import competition into a major line of work. Since 1980 the United States International Trade Commission (ITC) has received about 280 complaints alleging damage from imports that benefit from subsidies by foreign companies “dumped” their products in the United States at “less than fair value.” Even when no unfair practices are alleged, the simple claim that an industry has been injured by imports is sufficient grounds to seek relief.

Contrary to the general impression, this quest for import relief has hurt more companies than it has helped. As corporations begin to function globally, they develop an intricate web of marketing, production, and research relationships. The complexity of these relationships makes it unlikely that a system of import relief laws will meet the strategic needs of all the units under the same parent company.

Internationalization increases the danger that foreign companies will use import relief laws against the very companies the laws were designed to protect. Suppose a United States-owned company establishes an overseas plant to manufacture a product while its competitor makes the same product in the United States. If the competitor can prove injury from the imports—and that the United States company received a subsidy from a foreign government to build its plant abroad—the United States company’s products will be uncompetitive in the United States, since they would be subject to duties.

Perhaps the most brazen case occurred when the ITC investigated allegations that Canadian companies were injuring the United States salt industry by dumping rock salt, used to de-ice roads. The bizarre aspect of the complaint was that a foreign conglomerate with United States operations was crying for help against a United States company with foreign operations. The “United States” company claiming injury was a subsidiary of a Dutch conglomerate, while the “Canadian” companies included a subsidiary of a Chicago firm that was the second-largest domestic producer of rock salt.

不幸许多美国公司已把在进口竞争中寻求法律保护作为工作的一个主要方面。从1980年开始,美国国际贸易委员会接到了约280份投诉,投诉者声称自己的利益受到进口产品的损害。这些进口产品从外国政府的补助中获益。国际贸易委员会(ITC)还接到其它340份投诉,控告外国公司以低于合理价格向美国倾销商品。甚至在有不公平行为被指控的情况下,一个企业仅仅声称自己的利益因进口商品而受到损害,这种指控也足以作为理由来寻求救济。

与大众的想法截然不同的是,因这种救济受到损害的公司反而比受到帮助的公司多。这是因为当跨国公司开始全球性运作时,会建立一个错综复杂的销售生产网络和研究关系。这些复杂的关系使得进口救济法律体系不太可能满足总公司下所有单位的策略需求。而因为全球化又增加了一个风险——外国公司将利用进口救济法来压制此法意在保护的公司。假设一家美国公司在海外建立了一个工厂,与其在美国本土建厂的竞争者生产同样的产品,如果其竞争者能证明自己的利益受到这一进口商品的损害,并且这一美国公司还收到外国政府的补贴帮助其建厂,这个公司的产品将会受到关税的影响在美国失去竞争力。

也许最奇特的案例是 ITC 调查加拿大公司向美国倾销岩盐（用来清理道路积雪）这一指控。最奇怪的地方在于，一个在美国开公司的外国企业投诉在外国开公司的美国企业。“美国”公司声称损害是由“荷兰”公司的补助造成的，而“加拿大”公司有一个作为美国岩盐第二大生产商的芝加哥分公司。

12

Milankovitch proposed in the early twentieth century that the ice ages were caused by variations in the Earth's orbit around the Sun. For some time this theory was considered untestable, largely because there was no sufficiently precise chronology of the ice ages with which the orbital variations could be matched.

To establish such a chronology it is necessary to determine the relative amounts of land ice that existed at various times in the Earth's past. A recent discovery makes such a determination possible: relative land-ice volume for a given period can be deduced from the ratio of two oxygen isotopes, 16 and 18, found in ocean sediments. Almost all the oxygen in water is oxygen 16, but a few molecules out of every thousand incorporate the heavier isotope 18. When an ice age begins, the continental ice sheets grow, steadily reducing the amount of water evaporated from the ocean that will eventually return to it. Because heavier isotopes tend to be left behind when water evaporates from the ocean surfaces, the remaining ocean water becomes progressively enriched in oxygen 18. The degree of enrichment can be determined by analyzing ocean sediments of the period, because these sediments of the period, because these sediments are composed of calcium carbonate shells of marine organisms, shells that were constructed with oxygen atoms drawn from the surrounding ocean. The higher the ratio of oxygen 16 in a sedimentary specimen, the more land ice there was when the sediment was laid down.

As an indicator of shifts in the Earth's climate, the isotope record has two advantages. First, it is a global record: there is remarkably little variation in isotope ratios in sedimentary specimens taken from different continental locations. Second, it is a more continuous record than that taken from rocks on land. Because of these advantages, sedimentary evidence can be dated with sufficient accuracy by radiometric methods to establish a precise chronology of the ice ages. The dated isotope record shows that the fluctuations in global ice volume over the past several hundred thousand years have a pattern: an ice age occurs roughly once every 100,000 years. These data have established a strong connection between variations in the Earth's orbit and the periodicity of the ice ages.

However, it is important to note that other factors, such as volcanic particulates or variations in the amount of sunlight received by the Earth, could potentially have affected the climate. The advantage of the Milankovitch theory is that it is testable; changes in the Earth's orbit can be calculated and dated by applying Newton's laws of gravity to progressively earlier configurations of the

bodies in the solar system. Yet the lack of information about other possible factors affecting global climate does not make them unimportant.

米兰科维奇早在二十世纪初就提出冰期是由地球环绕太阳的轨道变化引起的。原先人们认为这一理论是无法证实的，主要是因为没有足够准确的冰期年表可以和轨道变化规律做比照。要建立冰期年表就需要测定以前地球上各个不同时期的陆冰相对存量。最新发现使这种测定成为可能：一个特定时期的相对陆冰量可以从海洋沉积物中氧的同位素 O_{16} 和 O_{18} 的比例推算出来。在水里，几乎所有的氧都是 O_{16} ，但是，在一千个水分子中，会有几个与 O_{18} 结合。冰期开始的时候，大陆冰盖逐渐增大，这使得从海洋蒸发最终又回到海洋的水稳步减少。当水份从海洋表面蒸发时，相对较重的 O_{18} 会留下来，所以海水中的 O_{18} 会越来越多。通过对这一时期海洋沉积物的分析就可以测定 O_{18} 的含量，因为这些沉积物是由海洋微生物的碳酸钙骨骼构成的，而这些骨骼又是获取周边海域的氧原子构建的。沉积物样本中 O_{18} 和 O_{16} 的比例越高，这些沉积物形成时期的陆冰面积就越大。

作为地球气候转变的标志，这种同位素记录有两大优势。其一，它是全球性的记录，从不同大洲取来的沉积物样本中同位素比例几乎没有区别。其二，与从岩石和土壤中获得的记录相比，它更具有连续性。因为有这些优势，才能通过辐射测量法测定沉积物样本的年代，从而建立准确的陆冰年表。确定年代的同位素记录显示出在过去几十万年中全球冰川变换的规律：冰期大约每 100000 年出现一次。这些数据还显示出地球轨道变化与冰期周期性之间的紧密联系。

然而，要注意的是火山微粒和地球所吸收阳光量的变化也可能是影响气候变化的潜在因素。米兰科维奇理论的优势在于它是可测定的。用牛顿重力定律可以计算出地球轨道变化并确定更早的太阳系天体布局年代。缺少其它影响地球气候的可能因素并不意味着已经确定的因素不重要。

13

Two works published in 1984 demonstrate contrasting approaches to writing the history of United States women. Buel and Buel's biography of Mary Fish (1736-1818) makes little effort to place her story in the context of recent historiography on women. Lebsock, meanwhile, attempts not only to write the history of women in one southern community, but also to redirect two decades of historiographical debate as to whether women gained or lost status on the nineteenth century as compared with the eighteenth century. Although both books offer the reader the opportunity to assess this controversy regarding women's status, only Lebsock's deals with it directly. She examines several different aspects of women's status, helping to refine and resolve the issues. She concludes that while women gained autonomy in some areas, especially in the private sphere, they lost it in many aspects of the economic sphere. More importantly, she shows that the debate itself depends on frame of reference: in many respects, women lost power in relation to men, for example, as certain jobs (delivering babies, supervising schools) were taken over by men. Yet women also gained power in comparison with their previous status, owning a higher proportion of real estate, for example. In contrast, Buel and Buel's biography provides ample raw material for questioning the myth, fostered by some historians,

of a colonial golden age in the eighteenth century but does not give the reader much guidance in analyzing the controversy over women' s status.

1984 年出版的两本书展现了描写美国女性历史所采用的两种截然不同的方式。在碧儿的自传《玛丽鱼》中，碧儿没有试图把自己的故事放在近来女性史学研究的背景下。相比之下，莱布斯克不仅描写了南部一地区的女性历史，还引述了关于女性在 19 世纪的地位与 18 世纪相比是提升了还是降低了这一历史学争论。尽管这两本书都向读者提供机会来了解关于女性地位的争议，但是只有莱布斯克直接涉及了这一争论。莱布斯克调查了女性在几个不同方面的地位问题，来帮助改善进而解决这一问题。并由调查得出，尽管女性在某些领域获得了自主权，尤其是在个人领域，但是在经济领域的许多方面女性却失去了自主权。更重要的是，她认为争论本身是建立在参照对比上的，例如，在许多方面，女性相对于男性而言就失去了权利，某些工作（生孩子、看管学校）由男性接替。而女性与她们以前的地位相比获得了权利，例如，拥有不动产的比例提高了。与莱布斯克相比，碧儿在她的自传中引用了大量的原始资料来质疑一些历史学家提出的 18 世纪的殖民黄金时期，但是她没有引导读者分析关于女性地位的争议。

14

It was once believed that the brain was independent of metabolic processes occurring elsewhere in the body. In recent studies, however, we have discovered that the production and release in brain neurons of the neurotransmitter serotonin (neurotransmitters are compounds that neurons use to transmit signals to other cells) depend directly on the food that the body processes.

Our first studies sought to determine whether the increase in serotonin observed on rats given a large injection of the amino acid tryptophan might also occur after rats ate meals that change tryptophan levels in the blood. We found that, immediately after the rats began to eat, parallel elevations occurred in blood tryptophan, brain tryptophan, and brain serotonin levels. These findings suggested that the production and release of serotonin in brain neurons were normally coupled with blood-tryptophan increases. In later studies we found that injecting insulin into a rat' s blood and brain tryptophan levels. We then decided to see whether the secretion of the animal' s own insulin similarly affected serotonin production. We gave the rats a carbohydrate-containing meal that we knew would elicit insulin secretion. As we had hypothesized, the blood tryptophan level and the concentrations of tryptophan level and the concentrations of tryptophan and of serotonin in the brain increased after the meal.

Surprisingly, however, when we added a large amount of protein to the meal, brain tryptophan and serotonin levels fell. Since protein contains tryptophan, why should it depress brain tryptophan levels? The answer lies in the mechanism that provides blood tryptophan to the brain cells. This same mechanism also provides the brain cells. This same mechanism also provides the brain cells with other amino acids found in protein, such as tyrosine and leucine. The consumption of protein increases blood concentration of the other amino acids much more, proportionately, than it does that of tryptophan. The more protein is in a meal, the lower is the ratio of the resulting

blood-tryptophan concentration to the concentration of competing amino acids, and the more slowly is tryptophan provided of the brain. Thus the more protein in a meal, the less serotonin subsequently produced and released.

以前，我们认为大脑独立于身体其它部位进行新陈代谢。但是，最近研究发现大脑神经细胞递质血清素（递质是神经细胞间用来传递信息的化学物质）的产生和释放与身体消化的食物有直接关系。

我们的第一项研究是为了确定在给大鼠注射大量色氨酸后所观察到的递质增加是否同样会出现在给大鼠饲喂能引起血液色氨酸含量提高的食物后。我们发现大鼠刚开始进食，其血液中的色氨酸，大脑中的色氨酸和大脑中的血清素水平都相应提高。这些迹象表明大脑神经递质血清素的产生和释放通常是与血液色氨酸含量的增加紧密相关。随后的研究发现给大鼠注射胰岛素也会使其血液中色氨酸，大脑中色氨酸和大脑中递质血清素水平都相应提高。然后我们决定看看大鼠自己分泌的胰岛素是否会对递质血清素的产生有相似的影响。于是，我们给大鼠喂含糖的食物，知道这会引发胰岛素分泌。正如我们所推测的，血液中的色氨酸水平和大脑中色氨酸与递质血清素的浓度都在喂食后提高了。

然而，出人意料的是，当在大鼠的食物中加入大量蛋白质时，大脑中色氨酸和递质血清素的水平却降低了。既然蛋白质含有色氨酸，大脑中的色氨酸水平为什么会降低呢？原因在于由血液向脑细胞提供色氨酸的机制。这一机制还向脑细胞提供蛋白质中的其它氨基酸，如酪氨酸和亮氨酸。蛋白质的食入使血液中其它氨基酸的浓度相对色氨酸提高了许多。食入的蛋白质越多，血液中色氨酸相对其它氨基酸的浓度就越低，色氨酸向大脑的提供就越慢。所以食入的蛋白质越多，随之产生和释放的递质血清素就越少。

15

In 1995 Maurice Duverger published *The Political Role of Women*, the first behavioralist, multinational comparison of women's electoral participation ever to use election data and survey data together. His study analyzed women's patterns of voting, political candidacy, and political activism in four European countries during the first half of the twentieth century. Duverger's research findings were that women voted somewhat less frequently than men (the difference narrowing the longer women had the vote) and were slightly more conservative.

Duverger's work set an early standard for the sensitive analysis of women's electoral activities. Moreover, to Duverger's credit, he placed his findings in the context of many of the historical processes that had shaped these activities. However, since these contexts have changed over time, Duverger's approach has proved more durable than his actual findings. In addition, Duverger's discussion of his findings was hampered by his failure to consider certain specific factors important to women's electoral participation at the time he collected his data: the influence of political regimes, the effects of political and social relations between women and men. Given this failure, Duverger's study foreshadowed the enduring limitations of the behavioralist approach to the multinational study of women's political participation.

1995, Maurice Duverger 出版了《女性的政治角色》，作为第一部行为主义著作，这部书中首次将选举数据和调查数据并用，对女性参与选举的情况进行了多国对比。Maurice Duverger 在研究中分析了 20 世纪上半叶欧洲四国女性的选举形势，候选资格和政治积极性。

研究表明，有时女性参加选举的频率低于男性（而女性参选时间越长，这一差别越小）并且比男性稍微保守些。

Duverger 的著作为细致分析女性选举行为创建了早期标准。此外，他将调查研究的背景置于影响女性选举活动发展的历史进程中，这也是值得称赞的。但是，因为这些背景是随时间变化的，所以 Duverger 的方法比他的研究结果更持久可靠。此外，Duverger 对其研究结果的进一步讨论收到了阻碍，因为他在收集数据时没有考虑到对女性参与选举有重要影响的某些特殊因素，比如国家政体，经济因素，女性和男性间的政治社会关系。由此，Duverger 的研究预示了行为主义者对女性参与政治的跨国研究所具有的局限将持续下去。

16

Frazier and Mosteller assert that medical research could be improved by a move toward larger, simpler clinical trials of medical treatments. Currently, researchers collect far more background information on patients than is strictly required for their trials—substantially more than hospitals collect—thereby escalating costs of data collection, storage, and analysis. Although limiting information collection could increase the risk, never entirely eliminable from research on entirely new treatments are new and unexpected variables likely to arise.

Frazier and Mosteller propose not only that researchers limit data collection on individual patients but also that researchers enroll more patients in clinical trials, thereby obtaining a more representative sample of the total population with the disease under study. Often researchers restrict study participation to patients who have no ailments besides those being studied. A treatment judged successful under these ideal conditions can then be evaluated under normal conditions. Broadening the range of trial participants, Frazier and Mosteller suggest, would enable researchers to evaluate a treatment's efficacy for diverse patients under various conditions and to evaluate its effectiveness for different patient subgroups. For example, the value of a treatment for a progressive disease may vary according to a patient's stage of disease. Patients' ages may also affect a treatment's efficacy.

Frazier 和 Mosteller 声称可以通过进行更大规模，更简单易行的药物临床试验来改进医学研究。现在，研究者收集的病人资料远远超过了做实验所需要从医院收集的资料，这使得收集、保存和分析数据的花费都增加了。尽管所收集资料的局限性会增加研究者忽略相关研究因素的风险，但是 Frazier 和 Mosteller 称这种风险不可能消除，只能在大多数研究中降到最低。只有在对新式疗法的研究中才有可能出现新的始料不及的变量。

Frazier 和 Mosteller 不仅建议研究者将数据收集限制在个别病人身上，还建议研究者在临床试验中多加入一些病例，这样才能从病人的总体中获得更具代表性的样本。通常，

研究者会把研究案例限制在除所研究病例外没有其它病情的病人中。如果治疗方案在这种理想的条件下被证明有效，将会被放在普通条件下再做评估。Frazier 和 Mosteller 认为扩大实验对象的范围便于研究者评估治疗方案在不同情况下对不同病人的疗效，以及对不同分组病人的有效性。例如，治疗方案的效果可能因病人所处病程的不同而变化。病人的年龄也可能影响疗效。

17

After evidence was obtained in 1920s that the universe is expanding, it became reasonable to ask: will the universe expand indefinitely, or is there enough mass in it for the mutual attraction of its constituents to bring this expansion to a halt? It can be calculated that the critical density of matter needed to brake the expansion and “close” the universe is equivalent to there hydrogen atoms per cubic meter. But the density of the observable universe—luminous matter in the form of galaxies—comes to only a fraction of this. If the expansion of the universe is to stop there must be enough invisible matter in the universe to exceed the luminous matter in density by a factor of roughly 70.

Our contribution to the search for this “missing matter” has been to study the rotational velocity of galaxies at various distances from their center of rotation. It has been known for some time that outside the bright nucleus of a typical spiral galaxy luminosity falls off rapidly with distance from the center. If luminosity were a true indicator of mass, most of the mass would be concentrated toward the center. Outside the nucleus the rotational velocity would decrease geometrically with distance from the center, in conformity with Kepler’s law. Instead we have found that the rotational velocity in spiral galaxies either remains constant with increasing distance from the center or increases slightly. This unexpected result indicates that the falloff in luminous mass with distance from the center is balanced by an increase in nonluminous mass.

Our findings suggest that as much as 90 percent of the mass of the universe is not radiating at any wavelength with enough intensity to be detected on the Earth. Such dark matter could be in the form of extremely dim stars of low mass, of large planets like Jupiter, or of black holes, either small or massive. While it has not yet been determined whether this mass is sufficient to close the universe, some physicists consider it significant that estimates are converging on the critical value.

十九世纪二十年代，人们证明宇宙是在不断扩大的，于是有人问：宇宙会继续无限地扩大下去，还是已经有足够大的质量来维系天体间的相互吸引使宇宙停止扩大。计算得出，使宇宙停止扩大所需要的临界密度等于三个氢原子/立方米。但是我们可以观测到的宇宙（星系中的可见物质）的密度小于该临界密度。如果要想宇宙停止扩大，那就必须要有超过可见物质密度约 70 倍的不可见物质存在。

为了寻找这些“丢失的物质”，我们研究了星系在据其环绕中心不同位置的环绕速度。我们曾经认为在典型螺旋星系的明亮中心以外，亮度随距中心距离的增加而急剧减弱。如果亮度

标志着质量，那么大部分质量就应该集中在星系的中心。而根据开普勒定律，随着距中心距离的增加环绕速度应该呈几何递减。可是，我们发现螺旋星系中天体的环绕速度保持不变或是随距离增加稍稍变快。这个出乎意料的结果表明随距中心距离的增加，不可见物质质量的增加抵消了可见物质质量的减少。

我们的研究表明占宇宙质量 90% 的物质不能发出可从地球上观测到的光。这种暗物质可能是特别暗的质量轻的恒星，大的行星如木星或者是大、小黑洞。虽然还没有确定这些质量是否足以使宇宙停止扩大，一些物理学家认为这些推测正趋向接近临界值，这是意义重大的。

18

According to a recent theory, Archean-age gold-quartz veins systems were formed more than two billion years ago from magmatic fluids that originated from molten granite-like bodies deep beneath the surface of the Earth. This theory is contrary to the widely held view that the systems were deposited from metamorphic fluids, that is, from fluids that formed during the dehydration of wet sedimentary rocks.

The recently developed theory has considerable practical importance. Most of the gold deposits discovered during the original gold rushes were exposed at the Earth's surface and were found because they had shed trails of alluvial gold that were easily easily traced by simple prospecting methods. Although these same methods still lead to an occasional discovery, most deposits not yet discovered have gone undetected because they are buried and have no surface expression.

The challenge in exploration is therefore to unravel the subsurface geology of an area and pinpoint the position of buried minerals. Methods widely used today include analysis of aerial images that yield a broad geological overview; geophysical techniques that provide data on the magnetic, electrical, and mineralogical properties of the rocks being investigated; and sensitive chemical tests that are able to detect the subtle chemical halos that often envelop mineralization. However, none of these high-technology methods are of any value if the sites to which they are applied have never mineralized, and to maximize the chances of discovery the explorer must therefore pay particular attention to selecting the ground formations most likely to be mineralized. Such ground selection relies to varying degrees on conceptual models, which take into account theoretical studies of relevant factors.

These models are constructed primarily from empirical observations of known mineral deposits and from theories of ore-forming processes. The explorer uses the models to identify those geological features that are critical to the formation of the mineralization being modeled, and then tries to select areas for exploration that exhibit as many of the critical features as possible.

依据最新的理论，太古界时期的金石英脉形成于 20 亿年前由深入地球表面以下真石胚体熔化形成的岩浆流体。这一理论与广泛认为的由变质岩流体的沉积形成理论（也就是在潮湿泥沙盐的干燥过程中形成）相反。

这一最新形成的理论有重大实践意义。在最初淘金热时发现的金矿床大多显露在地球表面，通过简单的勘探就会发现冲积砂金留下的痕迹，尽管通过这种方法还会偶尔发现金矿，然而大多数没有被发现的金矿就探测不到了，因为这类金矿深埋在地下，在地球表面也没有什么表现。

因此勘探的挑战在于弄清一个地域地表以下的地质问题并为埋藏的矿藏明确定位。今天广泛使用的方法包括：分析航拍图像得出地质概况，运用地球物理技术获得所研究矿石的磁、电和矿物性能，通过敏感的化学实验来检测通常被不易察觉的化学晕所包围的矿化。但是，如果勘察的这些地点从来没有矿化，想要有所发现勘探者就要特别留意挑选最有矿化可能的底层。这样在这些高科技方法中，就没有一个有任何价值了。这种地层选择依赖于概念模型的程度变化，而概念模型要考虑相关因素的理论研究。

这些模型的建立，主要是依据对所知矿石的实验观察和成矿过程的理论。勘探者用这些模型来鉴别所模拟矿化形成的临界地质特征，然后试着挑选具有较多临界特征的勘探地域。

19

The majority of successful senior managers do not closely follow the classical model of first clarifying goals, estimating likelihoods of success, making a decision, and only then taking action to implement the decision. Rather, in their day-by-day tactical maneuvers, these senior executives rely on what is vaguely termed “intuition” to manage a network of interrelated problems that require them to deal with ambiguity, inconsistency, novelty, and surprise; and to integrate action into the process of thinking.

Generations of writers on management have recognized that some practicing managers rely heavily on intuition. In general, however, such writers display a poor grasp of what intuition is. Some see it as the opposite of rationality; others view it as an excuse for capriciousness.

Isenberg’s recent research on the cognitive processes of senior managers reveals that managers’ intuition is neither of these. Rather, senior managers use intuition in at least five distinct ways. First, they intuitively sense when a problem exists. Second, managers rely on intuition to perform well-learned behavior patterns rapidly. This intuition is not arbitrary or irrational, but is based on years of painstaking practice and hands-on experience that build skills. A third function of intuition is to synthesize isolated bits of data and practice into an integrated picture, often in an “Aha!” experience. Fourth, some managers use intuition as a check in the results of more rational analysis. Most senior executives are familiar with the formal decision analysis models and tools and those who use such systematic methods for reaching decisions are occasionally leery of solutions suggested by these methods which run counter to their sense of the correct course of action. Finally, managers can use intuition to bypass in-depth analysis and move rapidly to engender a almost instantaneous cognitive process in which a manager recognizes familiar patterns.

One of the implications of the intuitive style of executive management is that “thinking” is inseparable from acting. Since managers often “know” what is right before they can analyze and explain it, they frequently act first and explain later. Analysis is inextricably tied to action in thinking/acting cycles, in which managers develop thoughts about their companies and organizations not by analyzing a problematic situation and then acting, but by acting problematic situation and then acting and analyzing in close concert. Given the great uncertainty of many of the management issues that they face, senior managers often instigate a course of action simply to learn more about an issue. they then use the results of the action to develop a more complete understanding of the issue. One implication of thinking/acting cycles is that action is often part of defining the problem, not just of implementing the solution.

大部分成功的高级管理者做决策时，并不是按照传统的理性模式，即首先澄清目标、分析问题、构想可行方案、估计成功的可能性，然后再采取行动执行决议。实际上这些高级决策者在面对一天天的战略性决策时，是依靠“直觉”这个模糊词来解决一系列错综复杂的问题。这要求他们能处理模棱两可、相互矛盾、新奇惊人的问题并且能在思考的过程中作出决策。一批撰写管理方面书籍的作者认为一些积极的管理者在很大程度上依靠直觉做决策。总的来说这些作家显然没有领悟到直觉是什么。一些作家认为直觉是理智的反义词，还有一些作家把直觉看做决策变幻莫测的借口。

Isenberg 最近关于高级管理者认知过程的研究显示，管理者的直觉不属于以上任何一种。相反，高级管理者的直觉用于以下明确的五种情况：第一、他们能用直觉感受到问题的存在。第二、管理者能依靠直觉将他们熟知的行动方式迅速付诸实施。这种直觉不是武断或者不理智，而是基于多年的辛苦实践和增强技能的亲身经历。直觉的第三种功能是把相互孤立的数据和实际行动整合起来，随之而来的通常是“啊！”的一声惊叹。第四、一些管理者用直觉来检验相对理性的分析。大多数管理者熟知正规的决策分析方式和方法，并且使用这种程序性方法做决策的管理者有时会怀疑那些与他们感觉正确的方案相反的建议决策。最后一条，决策者会用直觉避开更深层的分析从而更快得出合理可行的决策。直觉运用于以上情境就是管理者再认熟知模式时的瞬间认知过程。这种依靠直觉的决策管理在一方面暗指“思考”和行动是不可分割的。因为管理者通常在分析和解释一个决策之前就“知道”它是对的，他们经常先采取行动再做解释。在思考-行动的循环中分析与行动是密不可分的，在这个循环中逐渐形成对公司和组织的看法。这种看法的形成不是通过分析一个产生问题的情况然后采取行动，而是通过采取行动而后再分析。面对管理问题中的许多不确定因素，高级管理者往往先采取一种处理方法以便对问题多一些了解，然后用这种处理方式所产生的结果来完善对问题的了解。一个完善的思考-行动循环即行动通常是阐明问题过程的一部分，而不是仅仅实施解决方案。

All the cells in a particular plant start out with the same complement of genes. How then can these cells differentiate and form structures as different as roots, stems, leaves, and fruits? The answer is that only a small subset of the genes in

a particular kind of cell are expressed, or turned on, at a given time. This is accomplished by a complex system of chemical messengers that in plants include hormones and other regulatory molecules. Five major hormones have been identified: auxin, abscisic acid, cytokinin, ethylene, and gibberellin, studies of plants have now identified a new class of regulatory molecules called oligosaccharins.

Unlike the oligosaccharins, the five well-known plant hormones are pleiotropic rather than specific; that is, each has more than one effect on the growth and development of plants. The five have so many simultaneous effects that they are not very useful in artificially controlling the growth of crops. Auxin, for instance, stimulates the rate of cell elongation, causes the plant to develop a vascular system, to form lateral roots, and to produce ethylene.

The pleiotropy of the five well-studied plant hormones is somewhat analogous to that of certain hormones in animals. For example, hormones from the hypothalamus in the brain stimulate the anterior lobe of the pituitary gland to synthesize and release many different hormones, one of which stimulates the release of hormones have specific effects on target organs all over the body. One hormone stimulates the thyroid gland, for example, another the ovarian follicle cells, and so forth. In other words, there is a hierarchy of hormones.

Such a hierarchy may also exist in plants. Oligosaccharins are fragments of the cell wall released by enzymes release different oligosaccharins. There are indications that pleiotropic plant hormones may actually function by activating the enzymes that release these other, more specific chemical messengers from the cell wall.

一棵植物中的所有细胞都开始于一套完整的基因。这些细胞是怎样分化成不同的细胞从而形成根、茎、叶和果实的呢？这是因为在特定时期一种细胞中只有一小部分基因在表达或表现。这是通过植物中激素及其它调控分子等复杂的化学信息系统实现的。已经被证实的有五大激素：生长素、脱落酸、细胞分裂素、乙烯和赤霉素。现代又发现了一种新的调控分子寡聚糖素。

与特效寡聚糖素不同，这五种熟知的植物激素是多效的，也就是说每一种都对植物的生长发展有多种影响。这五种激素有太多的同期影响以至于对人为控制作物生长不是非常有效。例如生长素，刺激细胞伸长，使枝干向上生长，根向下生长，阻碍侧枝生长。生长素还能促进植物维管束的形成，侧枝的生长和乙烯的产生。

这五种熟知的植物基因的多效性与与某种动物基因的多效性类似。例如，下丘脑分泌的激素能刺激垂体前叶合成并释放多种激素。其中一种又能刺激肾上腺皮质分泌激素。这些激素对全身各个器官有特定的作用。一种刺激甲状腺，另一种刺激卵泡细胞，等等。。。换句话说就是一种激素层级。

这种层级也可能在植物中存在。寡聚糖素是酶分解的细胞壁碎片：不同的酶分解不同的寡聚糖素。有指征说明多效的植物激素可能通过激活从细胞壁释放其它化学信息的酶来起作用。

According to a recent theory, Archean-age gold-quartz vein systems were formed more than two billion years ago from magmatic fluids that originated from molten granite-like bodies deep beneath the surface of the Earth. This theory is contrary to the widely held view that the systems were deposited from metamorphic fluids, that is, from fluids that formed during the dehydration of wet sedimentary rocks.

最近的一种理论认为太古时代金石英纹理系统形成于超过二十亿年前的岩浆液体, 这些岩浆源自于熔化的地底深层的花岗岩主体。这个理论和广泛传播的理论相反, 后者认为纹理系统是变质的液体沉淀而成的, 变质的液体是湿润的沉淀岩石脱水而成。

The recently developed theory has considerable practical importance. Most of the gold deposits discovered during the original gold rushes were exposed at the Earth's surface and were found because they had shed trails of alluvial gold that were easily traced by simple prospecting methods. Although these same methods still lead to an occasional discovery, most deposits not yet discovered have gone undetected because they are buried and have no surface expression.

最近发展而成的理论被认为对实践有重要意义。在最初淘金浪潮中发现的大部分金矿, 是由于它们暴露在地表, 或者它们被发现是因为显露了通过简单的方法容易被追踪的冲积痕迹。尽管使用这种相同的方法偶尔还能发现矿床, 但大部分没发现的矿床不能被探测到是深埋地底而且没有地表特征。

The challenge in exploration is therefore to unravel the subsurface geology of an area and pinpoint the position of buried minerals. Methods widely used today include analysis of aerial images that yield a broad geological overview; geophysical techniques that provide data on the magnetic, electrical, and mineralogical properties of the rocks being investigated; and sensitive chemical tests that are able to detect the subtle chemical halos that often envelop mineralization. However, none of these high-technology methods are of any value if the sites to which they are applied have never mineralized, and to maximize the chances of discovery the explorer must therefore pay particular attention to selecting the ground formations most likely to be mineralized. Such ground selection relies to varying degrees on conceptual models, which take into account theoretical studies of relevant factors.

因此, 勘探的挑战性在于揭示一个区域地底的地质状况, 以及对埋藏的矿产精准定位。如今被广泛利用的方法包括大气图像分析法, 产生一副大致的地质轮廓图像; 地球物理学技术提供被研究岩石磁、电和矿物学特征的数据; 以及灵敏化学测试, 能够探测到一般矿化后包围着岩石微小的晕状物。不过, 所有这些的高技术方法只有在矿化了的地址中适用, 为了最大化发现矿产, 探测者有必要特别注意去选择那些很可能被矿化了地方。这种地面选择法依赖概念模型的变化幅度, 这就要对相关因素的理论研究予以考虑。

These models are constructed primarily from empirical observations of known mineral deposits and from theories of ore-forming processes. The explorer uses the models to identify those geological features that are critical to the formation of the mineralization being modeled, and then tries to select areas for exploration that exhibit as many of the critical features as possible.

这些模型主要是由已知矿床的实践观察和矿石形成的理论构建的。探测者利用这个模型去识别那些对形成矿化有关键的地质特征, 然后尽量选择展现众多关键特征的地方进行勘探。

While the most abundant and dominant species within a particular ecosystem is often crucial in perpetuating the ecosystem, a “keystone” species, here defined as one whose effects are much larger than would be predicted from its abundance, can also play a vital role. But because complex species interactions may be involved, identifying a keystone species by removing the species and observing changes in the ecosystem is problematic. It might seem that certain traits would clearly define a species as a keystone species; for example, *Pisaster ochraceus* is often a keystone predator because it consumes and suppresses mussel populations, which in the absence of this starfish can be a dominant species. But such predation on a dominant or potentially dominant species occurs in systems that do as well as in systems that do not have species that play keystone roles. Moreover, whereas *P. ochraceus* occupies an unambiguous keystone role on wave-exposed rocky headlands, in more wave-sheltered habitats the impact of *P. ochraceus* predation is weak or nonexistent, and at certain sites sand burial is responsible for eliminating mussels. Keystone status appears to depend on context, whether of particular geography or of such factors as community diversity (for example, a reduction in species diversity may thrust more of the remaining species into keystone roles) and length of species interaction (since newly arrived species in particular may dramatically affect ecosystems).

在一个特定的生态系统中,最丰富和占据主导地位的物种往往对生态系统的延续性起着重要的作用,这种物种称为 keystone,被定义为影响性远远大于其数量性所能预测的,同时扮演着至关重要的角色。但由于包含复杂的物种相互影响,通过移出某个物种来观察造成生态系统的变化来确定该物种是 keystone 值得商榷。某些确定的特征可以清晰地确定某个物种是 keystone。例如, *P* 经常作为捕食者 keystone 的角色,因为 *P* 捕食和限制蚝的数量,而 *P* 在没有海星存在的情况下会占据主导地位。但是,这种行为不仅在有主导或亚主导物种的系统中,在没有扮演 keystone 的系统中同样存在。而且,鉴于 *P* 在波浪暴露的海峡扮演一个不明晰的 keystone 角色,在更多波浪聚集的栖息地, *P* 的捕食影响更少甚至不存在,在某些特定的地方,蚝被消除更多是因为被沙埋葬。keystone 的地位根据环境而改变,是否特定的地形或者如群落的多样性(物种多样性的减少可能会推动剩余的物种充当 keystone 的角色)和物种相互影响的时间(新来物种的引入对生态系统影响巨大)来决定。

After evidence was obtained in the 1920s that the universe is expanding, it became reasonable to ask: Will the universe continue to expand indefinitely, or is there enough mass in it for the mutual attraction of its constituents to bring this expansion to a halt? It can be calculated that the critical density of matter needed to brake the expansion and "close" the universe is equivalent to three hydrogen atoms per cubic meter. But the density of the observable universe--luminous matter in the form of galaxies--comes to only a fraction of this. If the expansion of the universe is to stop, there must be enough invisible matter in the universe to exceed the luminous matter in density by a factor of roughly 70.

宇宙在不断扩张在 19 世纪 20 年代获得证实后,很自然会提问宇宙是继续无限扩张,还是已经由足够的质量来维系成分间的相互引力从而停止这种扩张。可以计算出停止这种扩张和闭合宇宙的物质临界密度相当于每立方米三个氢原子质量。但是宇宙中可见物质(星系中发光的物质)的密度只占一小部分。如果要停止宇宙扩张,就必须是不可见物质密度足够超过可见物质密度的 70 倍。

Our contribution to the search for this "missing matter" has been to study the rotational velocity of galaxies at various distances from their center of rotation. It has been known for some time that outside the bright nucleus of a typical spiral galaxy luminosity falls off rapidly with distance from the center. If luminosity were a true indicator of mass, most of the mass would be concentrated toward the center. Outside the nucleus the rotational velocity would decrease geometrically with distance from the center, in conformity with Kepler's law. Instead we have found that the rotational velocity in spiral galaxies either remains constant with increasing distance from the center or increases slightly. This unexpected result indicates that the falloff in luminous mass with distance from the center is balanced by an increase in nonluminous mass.

对不可见物质的研究，我们的贡献是研究了星系与其所环绕中心不同距离的旋转速率。我们早就知道一个核心明亮的典型星系外部的光度随着与核心距离不断增加而减少。假如光度真的是质量的一个度量，那么大部分的质量应该聚集在核心位置。遵循开普勒定律，核心以外的旋转速率会随着距离的增加而几何级减少。相反，我们发现螺旋星系旋转速率随着距离的增大保持匀速或者只是轻微的变大。这个未曾预料的结果表明随着距离的增加发光质量的减少被不发光质量的增加所抵消。

Our findings suggest that as much as 90 percent of the mass of the universe is not radiating at any wavelength with enough intensity to be detected on the Earth. Such dark matter could be in the form of extremely dim stars of low mass, of large planets like Jupiter, or of black holes, either small or massive. While it has not yet been determined whether this mass is sufficient to close the universe, some physicists consider it significant that estimates are converging on the critical value. 我们的发现表明，宇宙中多达 90% 的质量辐射的强度，在地球以任何波长都探测不到。这些暗质量可以是极度昏暗的低质量恒星，可以是大到如土星的行星，或者是大和小黑洞。虽然尚未确定这个质量是否大到足够闭合宇宙，部分物理学家认为由于这个数值与临界值趋同，它具有重大意义。

24

Jon Clark's study of the effect of the modernization of a telephone exchange on exchange maintenance work and workers is a solid contribution to a debate that encompasses two lively issues in the history and sociology of technology: technological determinism and social constructivism.

J C 关于交换维护工作和工人间电信交换现代化影响的研究，为围绕历史和社会的技术论两个实在问题的辩论提供了坚实的贡献，这两个问题分别为：技术决定论和社会构建论。

Clark makes the point that the characteristics of a technology have a decisive influence on job skills and work organization. Put more strongly, technology can be a primary determinant of social and managerial organization. Clark believes this possibility has been obscured by the recent sociological fashion, exemplified by Braverman's analysis, that emphasizes the way machinery

reflects social choices. For Braverman, the shape of a technological system is subordinate to the manager's desire to wrest control of the labor process from the workers. Technological change is construed as the outcome of negotiations among interested parties who seek to incorporate their own interests into the design and configuration of the machinery. This position represents the new mainstream called social constructivism.

C提及的重点是，技术特性是影响工作技能和工作制度的决定性因素。更有力的解释是，技术可以是社会和经管制度的首要决定因素。C认为这种可能性已经被近期的社会学风潮所掩盖，例如B的分析，他过分强调了机械反映社会选择的方式。对于B，技术系统的形态是从属于管理者渴求，即从工人手中夺取劳动工序的控制权。技术的改变作为那些试图将自己的利益融合到机械的设计和组合当中利益相关方谈判的结果。这个观点是新主流的代表，被称为社会构建主义。

The constructivists gain acceptance by misrepresenting technological determinism: technological determinists are supposed to believe, for example, that machinery imposes appropriate forms of order on society. The alternative to constructivism, in other words, is to view technology as existing outside society, capable of directly influencing skills and work organization.

构建主义者通过扭曲技术决定论获得应可，他们说技术决定论相信，例如，机械把适当的制度形式强制实施于社会。换句话说，替代社会构建论的是把技术论看作存在于社会之外，可以直接影响技能和工作制度的。

Clark refutes the extremes of the constructivists by both theoretical and empirical arguments. Theoretically he defines "technology" in terms of relationships between social and technical variables. Attempts to reduce the meaning of technology to cold, hard metal are bound to fail, for machinery is just scrap unless it is organized functionally and supported by appropriate systems of operation and maintenance. At the empirical level Clark shows how a change at the telephone exchange from maintenance-intensive electromechanical switches to semielectronic switching systems altered work tasks, skills, training opportunities, administration, and organization of workers. Some changes Clark attributes to the particular way management and labor unions negotiated the introduction of the technology, whereas others are seen as arising from the capabilities and nature of the technology itself. Thus Clark helps answer the question: "When is social choice decisive and when are the concrete characteristics of technology more important?"

C同时在理论和实践两个方面驳斥极端的构建主义者。理论上，他把技术定义为社会和技术变量的关系。试图把技术的含义简化为冰冷的硬金属注定要失败的，因为机械只是零散的碎片，除非被功能性地组织起来和得到恰当的系统去运作与维护。在实践层面，C展示了电信交换怎么从维护密集型机电转换到半电子转换系统来改变工作任务、技能、培训机会、管理和工人制度。C把一些改变归因于管理和劳动组织谈判引进技术这种特殊方式，而其他人认为改变是由技术本身的功能和性质产生的。因此，C可以帮助回答这个问题，什么时候是社会选择决定，什么时候是技术的具体特性起重要作用。

All the cells in a particular plant start out with the same complement of genes. How then can these cells differentiate and form structures as different as roots, stems, leaves, and fruits? The answer is that only a small subset of the genes in a particular kind of cell are expressed, or turned on, at a

given time. This is accomplished by a complex system of chemical messengers that in plants include hormones and other regulatory molecules. Five major hormones have been identified: auxin, abscisic acid, cytokinin, ethylene, and gibberellin. Studies of plants have now identified a new class of regulatory molecules called oligosaccharins.

一株植物中所有的细胞都始于一套相同的完整基因。这些细胞又是怎么分化构成不同的组织，如根、茎、叶和果实的？答案是在给定的时间段，基因中只有一个特定的细小集合在表达和运行。这个过程通过植物中化学媒介（包括荷尔蒙和其他调控分子）的复杂系统来完成。五个主要的荷尔蒙已经被识别出来：植物生长素、脱落酸、细胞分裂素、乙烯和赤霉素。如今对于植物的研究，发现了一类新的调控分子，称为寡糖素。

Unlike the oligosaccharins, the five well-known plant hormones are pleiotropic rather than specific; that is, each has more than one effect on the growth and development of plants. The five have so many simultaneous effects that they are not very useful in artificially controlling the growth of crops. Auxin, for instance, stimulates the rate of cell elongation, causes shoots to grow up and roots to grow down, and inhibits the growth of lateral shoots. Auxin also causes the plant to develop a vascular system, to form lateral roots, and to produce ethylene.

和寡糖素不同，五种广为人知的植物荷尔蒙是多效性而非针对性的，也就是说每一种荷尔蒙对植物的生长和发育的影响是多方面的。由于这五种荷尔蒙在会对植物产生多种同期的影响，所以它们不适合用来人为控制植物生长。例如，植物生长素，刺激了细胞的伸长，使树干向上生长和根向下生长，同时抑制侧枝的生长。而且，还使植物形成植物维管系统、侧根和产生乙烯。

The pleiotropy of the five well-studied plant hormones is somewhat analogous to that of certain hormones in animals. For example, hormones from the hypothalamus in the brain stimulate the anterior lobe of the pituitary gland to synthesize and release many different hormones, one of which stimulates the release of hormones from the adrenal cortex. These hormones have specific effects on target organs all over the body. One hormone stimulates the thyroid gland, for example, another the ovarian follicle cells, and so forth. In other words, there is a hierarchy of hormones.

五种研究深入的植物荷尔蒙的多效性某程度上类似于动物特定的荷尔蒙。例如，大脑下丘脑分泌的荷尔蒙刺激垂体前叶腺合成和释放多种不同的荷尔蒙，其中一种荷尔蒙会刺激肾上腺皮层释放另一种荷尔蒙。这些荷尔蒙对全身的目标器官有特定的影响。例如一种荷尔蒙刺激甲状腺，另一种刺激卵巢囊细胞，等等。也就是说，荷尔蒙是有层次的。

Such a hierarchy may also exist in plants. Oligosaccharins are fragments of the cell wall released by enzymes: different enzymes release different oligosaccharins. There are indications that pleiotropic plant hormones may actually function by activating the enzymes that release these other, more specific chemical messengers from the cell wall.

这种层次在植物中可能同样存在。寡糖素是酶所释放的细胞壁片段：不同的酶释放不同的寡糖素。有迹象表明，多效性的植物荷尔蒙的作用是通过激活细胞壁中的酶释放更独特化学媒介。

In the two decades between 1910 and 1930, over ten percent of the Black population of the United States left the South, where the preponderance of the Black population had been located, and migrated to northern states, with the largest number moving, it is claimed, between 1916 and 1918. It has been frequently assumed, but not proved, that the majority of the migrants in what has come to be called the Great Migration came from rural areas and were motivated by two concurrent factors: the collapse of the cotton industry following the boll weevil infestation, which began in 1898, and increased demand in the North for labor following the cessation of European immigration caused by the outbreak of the First World War in 1914. This assumption has led to the conclusion that the migrants' subsequent lack of economic mobility in the North is tied to rural background, a background that implies unfamiliarity with urban living and a lack of industrial skills.

在 1910 到 1930 年 20 年间，超过 10% 的黑人族群离开他们主要聚居的南部，向北部各洲迁移，其中 1916 到 1918 被认为是人数最多迁移的时间段。一直被猜测但从没证明，称为大迁徙中大部分的移民来自农村，他们迁徙主要由两个同时发生的因素引起的：1898 年棉铃象鼻虫灾害导致棉花产业的崩溃和 1914 年第一次世界大战爆发欧洲移民的中止使北方对劳动力需求增加。这个假设得出如下结论：在北方的移民后来缺乏经济灵活性和他们农村背景紧密联系的，这样的背景暗示他们对城市生活不熟悉和缺乏工业技能。

But the question of who actually left the South has never been rigorously investigated. Although numerous investigations document an exodus from rural southern areas to southern cities prior to the Great Migration, no one has considered whether the same migrants then moved on to northern cities. In 1910 over 600,000 Black workers, or ten percent of the Black work force, reported themselves to be engaged in "manufacturing and mechanical pursuits," the federal census category roughly encompassing the entire industrial sector. The Great Migration could easily have been made up entirely of this group and their families. It is perhaps surprising to argue that an employed population could be enticed to move, but an explanation lies in the labor conditions then prevalent in the South.

但是对于究竟是哪些人离开南部从来没有严格地调查。尽管大量的研究记录了在大迁徙之前，南方大批农村人口向城市迁移，但没有人探究是否同为这些人再迁移到北方城市。在 1910 年超过 600,000 黑人工人大概 10% 黑人劳动力说自己从事制造业或机械业的工作，联邦分类普查几乎覆盖整个工业领域。大迁徙人就基本由这群人及其家人所组成。也许对于已经有工作的人能够被诱惑迁徙到其他地方的争论很惊人，但可以由当时盛行的南方劳动环境得到解释。

About thirty-five percent of the urban Black population in the South was engaged in skilled trades. Some were from the old artisan class of slavery-blacksmiths, masons, carpenters-which had had a monopoly of certain trades, but they were gradually being pushed out by competition, mechanization, and obsolescence. The remaining sixty-five percent, more recently urbanized, worked in newly developed industries-tobacco, lumber, coal and iron manufacture, and railroads. Wages in the South, however, were low, and Black workers were aware, through labor recruiters and the Black press, that they could earn more even as unskilled workers in the North than they could as artisans in the South. After the boll weevil infestation, urban Black workers faced competition from the continuing influx of both Black and White rural workers, who were driven to

undercut the wages formerly paid for industrial jobs. Thus, a move north would be seen as advantageous to a group that was already urbanized and steadily employed, and the easy conclusion tying their subsequent economic problems in the North to their rural background comes into question.

大约 35%南方的城市黑人从事熟练行业。有些是奴隶技工的后代，如铁匠、泥瓦匠和木匠，曾经在特定行业处于垄断地位，但是由于竞争、机械化和陈旧过时逐渐被淘汰。其余的 65%，很多是近期城市化的人口，从事新兴产业，如烟草、伐木、煤炭和钢铁业，或者是修建铁路。但是，南方的工资低，黑人通过招募广告和新闻意识到，在北方从事非技术工收入比南方的技术工还要高。棉铃象鼻虫灾害后，城市黑人面临不断涌入来自农村的黑人和白人的竞争，他们被迫以低工资竞争原来属于城市人的工作。因此，向北迁徙对那些已经城市化和有稳定工作的群组可以看作是有利的，而且简单地作出后来迁徙到北方的人因为农村背景而有经济问题的结论是值得质疑的。