

The Ingenuity Gap

创新的空白

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阅读原文

- A. Ingenuity, as I define it here, consists not only of ideas for new technologies like computers or drought-resistant crops but, more fundamentally, of ideas for better institutions and social arrangements, like efficient markets and competent governments.
- B. How much and what kinds of ingenuity a society requires depends on a range of factors, including the society's goals and the circumstances within which it must achieve those goals—whether it has a young population or an aging one, an abundance of natural resources or a scarcity of them, an easy climate or a punishing one, whatever the case may be.
- C. How much and what kinds of ingenuity a society supplies also depends on many factors, such as the nature of human inventiveness and understanding, the rewards an economy gives to the producers of useful knowledge, and the strength of political opposition to social and institutional reforms.
- D. A good supply of the right kind of ingenuity is essential, but it isn't, of course, enough by itself. We know that the creation of wealth, for example, depends not only on an adequate supply of useful ideas but also on the availability of other, more conventional factors of production, like capital and labor. Similarly, prosperity, stability and justice usually depend on the resolution, or at least the containment, of major political struggles over wealth and power. Yet within our economics ingenuity often supplants labor, and growth in the stock of physical plant is usually accompanied by growth in the stock of ingenuity. And in our political systems, we need great ingenuity to set up institutions that successfully manage struggles over wealth and power. Clearly, our economic and political processes are intimately entangled with the production and use of ingenuity.
- E. The past century's countless incremental changes in our societies around the planet, in our technologies and our interactions with our surrounding natural environments have accumulated to create a qualitatively new world. Because these changes have accumulated slowly, it's often hard for us to recognize how profound and sweeping they've been. They include far larger and denser populations; much higher per capita consumption of natural resources; and far better and more widely available technologies for the movement of people, materials, and especially information.
- F. In combination, these changes have sharply increased the density, intensity, and pace of our interactions with each other; they have greatly increased the burden we place on our natural environment; and they have helped shift power from national and international institutions to individuals and subgroups, such as political special interests and ethnic factions.
- G. As a result, people in all walks of life—from our political and business leaders to all of us in our day-to-day—must cope with much more complex, urgent, and often unpredictable circumstances. The management of our relationship with this new world requires immense and ever-increasing amounts of social and technical ingenuity. As we strive to maintain or increase our prosperity and improve the quality of our lives, we must make far more sophisticated decisions, and in less time, than ever before.
- H. When we enhance the performance of any system, from our cars to the planet's network of financial institutions, we tend to make it more complex. Many of the natural systems critical to our well-being, like the

global climate and the oceans, are extraordinarily complex to begin with. We often can't predict or manage the behavior of complex systems with much precision, because they are often very sensitive to the smallest of changes and perturbations, and their behavior can flip from one mode to another suddenly and dramatically. In general, as the human-made and natural systems we depend upon become more complex, and as our demands on them increase, the institutions and technologies we use to manage them must become more complex too, which further boosts our need for ingenuity.

- I. The good news, though, is that the last century's stunning changes in our societies and technologies have not just increased our need for ingenuity; they have also produced a huge increase in its supply. The growth and urbanization of human populations have combined with astonishing new communication and transportation technologies to expand interactions among people and produce larger, more integrated, and more efficient markets. These changes have, in turn, vastly accelerated the generation and delivery of useful ideas.
- J. But—and this is the critical "but"—we should not jump to the conclusion that the supply of ingenuity always increases in lockstep with our ingenuity requirement: While it's true that necessity is often the mother of invention, we can't always rely on the right kind of ingenuity appearing when and where we need it. In many cases, the complexity and speed of operation of today's vital economic, social, and ecological systems exceed the human brain's grasp. Very few of us have more than a rudimentary understanding of how these systems work. They remain fraught with countless "unknown unknowns," which makes it hard to supply the ingenuity we need to solve problems associated with these systems.
- K. In this book, explore a wide range of other factors that will limit our ability to supply the ingenuity required in the coming century. For example, many people believe that new communication technologies strengthen democracy and will make it easier to find solutions to our societies' collective problems, but the story is less clear than it seems. The crush of information in our everyday lives is shortening our attention span, limiting the time we have to reflect on critical matters of public policy, and making policy arguments more superficial.
- L. Modern markets and science are an important part of the story of how we supply ingenuity. Markets are critically important, because they give entrepreneurs an incentive to produce knowledge. As for science, although it seems to face no theoretical limits, at least in the foreseeable future, practical constraints often slow its progress. The cost of scientific research tends to increase as it delves deeper into nature. And science's rate of advance depends on the characteristic of the natural phenomena it investigates, simply because some phenomena are intrinsically harder to understand than others, so the production of useful new knowledge in these areas can be very slow. Consequently, there is often a critical time lag between the recognition between a problem and the delivery of sufficient ingenuity, in the form of technologies, to solve that problem. Progress in the social sciences is especially slow, for reasons we don't yet understand; but we desperately need better social scientific knowledge to build the sophisticated institutions today's world demands.

High Speed Photography

高速摄影

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阅读原文

- A. Photography gained the interest of many scientists and artists from its inception. Scientists have used photography to record and study movements, such as Eadweard Muybridge's study of human and animal locomotion in 1887. Artists are equally interested by these aspects but also try to explore avenues other than photo-mechanical representation of reality, such as the pictorialist movement. military, police, and security forces use photography for surveillance, recognition and data storage. Photography is used by amateurs to preserve memories, to capture special moments, to tell stories, to send messages, and as a source of entertainment. Various technological improvements and techniques have even allowed for visualizing events that are too fast or too slow for the human eye.
- B. One of such techniques is called fast motion or professionally known as time-lapse. Time-lapse photography is the perfect technique for capturing events and movements in the natural world that occur over a timescale too slow for human perception to follow. The life cycle of a mushroom, for example, is incredibly subtle to the human eye. To present its growth in front of audiences, the principle applied is a simple one: a series of photographs are taken and used in sequence to make a moving-image film since each frame is taken with a lapse at a time interval between each shot, when played back at normal speed, a continuous action is produced and it appears to speed up. Put simply: we are shrinking time. Objects and events that would normally take several minutes, days or even months can be viewed to completion in seconds having been sped up by factors of tens to millions.
- C. Another commonly used technique is high-speed photography, the science of taking pictures of very fast phenomena. High-speed photography can be considered to be the opposite of time-lapse photography. One of the many applications is found in biology studies to study birds, bats and even spider silk. Imagine a hummingbird hovering almost completely still in the air. Feeding on nectar. With every flap, its wings bend, flex and change shape. These subtle movements precisely control the lift its wings generate, making it an excellent hoverer. But a hummingbird flaps its wings up to 80 times every second. The only way to truly capture this motion is with cameras that will, in effect, slow down time. To do this, a greater length of film is taken at a high sampling frequency or frame rate, which is much faster than it will be projected on screen. When replayed at normal speed, time appears to be slowed down proportionately. That is why high-speed cameras have become such a mainstay of biology.
- D. In common usage, high-speed photography can also refer to the use of high-speed cameras that the photograph itself may be taken in a way as to appear to freeze the motion, especially to reduce motion blur. It requires a sensor with good sensitivity and either a very good shuttering system or a very fast strobe light. The recent National Geographic footage—captured last summer during an intensive three-day shoot at the Cincinnati Zoo—is unprecedented in its clarity and detail. "I've watched cheetahs run for 30 years," said Cathryn Hilker, founder of the zoo's Cat Ambassador Program. "But I saw things in that super slow-motion video that I've never seen before." The slow-motion video is entrancing. Every part of the sprinting cat's

anatomy—supple limbs, rippling muscles, hyperflexible spine—works together in a symphony of speed, revealing the fluid grace of the world's fastest land animal.

- E.** But things can't get any more complicated in the case of filming a frog catching its prey. Frogs can snatch up prey in a few thousandths of a second—striking out with elastic tongues. Biologists would love to see how a frog's tongue roll out, adhere to prey, and roll back into the frog's mouth. But this all happened too fast, 50 times faster than an eye blink. So naturally people thought of using high-speed camera to capture this fantastic movement in slow motion. Yet one problem still remains —viewers would be bored if they watch the frog swim in slow motion for too long. So how to skip this? The solution is a simple one —adjust the playback speed, which is also called by some the film speed adjustment. The film will originally be shot at a high frame (often 300 frames per second, because it can be converted to much lower frame rates without major issues), but at later editing stage this high frame rate will only be preserved for the prey catching part, while the swimming part will be converted to the normal speed at 24 frames per second. Voila, the scientist can now sit back and enjoy watching without having to go through the pain of waiting.
- F.** sometimes taking a good picture or shooting a good film is not all about technology, but patience, like in the case of bat. Bats are small, dark-colored; they fly fast and are active only at night. To capture bats on film, one must use some type of camera-tripping device. Photographers or film-makers often place camera near the bat cave, on the path of the flying bats. The camera must be hard-wired with tripping device so that every time a bat breaks the tripping beam the camera fires and it will keep doing so through the night until the camera's battery runs out. Though highly-advanced tripping device can now allow for unmanned shooting, it will may take several nights to get a truly high quality film.
- G.** Is it science ? Is it art? Since the technique was first pioneered around two hundred years ago, photography has developed to a state where it is almost unrecognizable. Some people would even say the future of photography will be nothing like how we imagine it. No matter what future it may hold, photography will continue to develop as it has been repeatedly demonstrated in many aspects of our life that “a picture is worth a thousand words”.

Cosmetics in Ancient Past

古代化妆品

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阅读原文

- A. Since cosmetics and perfumes are still in wide use today, it is interesting to compare the attitudes, customs and beliefs related to them in ancient times to those of our own day and age. Cosmetics and perfumes have been popular since the dawn of civilization; it is shown by the discovery of a great deal of pertinent archeological material, dating from the third millennium BC. Mosaics, glass perfume flasks, stone vessels, ovens, cooking-pots, clay jars, etc., some inscribed by the hand of the artisan. evidence also appears in the Bible and other classical writings, where it is written that spices and perfumes were prestigious products known throughout the ancient world and coveted by kings and princes. The written and pictorial descriptions, as well as archaeological findings, all show how important body care and aesthetic appearance were in the lives of the ancient people. The chain of evidence spans many centuries, detailing the usage of cosmetics in various cultures from the earliest period of recorded history.
- B. In antiquity, however, at least in the onset, cosmetics served in religious ceremonies and for healing purposes. Cosmetics were also connected with cultic worship and witchcraft: to appease the various gods, fragrant ointments were applied to the statuary images and even to their attendants. From this, in the course of time, developed the custom of personal use, to enhance the beauty of the face and the body, and to conceal defects.
- C. Perfumes and fragrant spices were precious commodities in antiquity, very much in demand, and at times even exceeded silver and gold in value. Therefore they were luxury products, used mainly in the temples and in the homes of the noble and the wealthy. The Judean kings kept them in treasure houses (2 Kings 20:13). And the Queen of Sheba brought to Solomon "camels laden with spices, gold in great quantity and precious stones." (1 Kings 10:2,10). However, within time, the use of cosmetics became the custom of that period. The use of cosmetics became widespread among the lower classes as well as among the wealthy; in the same way they washed the body, so they used to care for the body with substances that softened the skin and anoint it with fragrant oils and ointments.
- D. Facial treatment was highly developed and women devoted many hours to it. They used to spread various scented creams on the face and to apply makeup in vivid and contrasting colors. An Egyptian papyrus from the 16th century BC contains detailed recipes to remove blemishes, wrinkles, and other signs of age. Greek and Roman women would cover their faces in the evening with a "beauty mask" to remove blemishes, which consisted mainly of flour mixed with fragrant spices, leaving it on their face all night. The next morning they would wash it off with asses' milk. The very common creams used by women in the ancient Far East, particularly important in the hot climate and prevalent in that area of the globe, were made up of oils and aromatic scents. Sometimes the oil in these creams was extracted from olives, almonds, gourds, sesame, or from trees and plants; but, for those of limited means, scented animal and fish fats were commonly used.
- E. Women in ancient past commonly put colors around their eyes. Besides beautification, its purpose was also medicinal as covering the sensitive skin of the lids with colored ointments that prevented dryness and eye diseases: the eye-paint repelled the little flies that transmitted eye inflammations. Egyptian women colored the upper eyelid black and the lower one green, and painted the space between the upper lid and the eyebrow gray or blue. The women of Mesopotamia favored yellows and reds. The use of kohl for painting the eyes is

mentioned three times in the Bible, always with disapproval by the sages (2 Kings, 9:30; Jeremiah 4:30; Ezekiel 23:40). In contrast, Job names one of his daughters "Keren Happukh" —"horn of eye paint" (Job 42:14)

- F.** Great importance was attached to the care for hair in ancient times. Long hair was always considered a symbol of beauty, and kings, nobles and dignitaries grew their hair long and kept it well-groomed and cared for. Women devoted much time to the style of the hair, while not culling, they would apply much care to it by arranging it skillfully in plaits and "building it up" sometimes with the help of wigs. Egyptian women generally wore their hair flowing down to their shoulders or even longer. In Mesopotamia, women cherished long hair as a part of their beauty, and hair flowing down their backs in a thick plait and tied with a ribbon is seen in art. Assyrian women wore their hair shorter, braiding and binding it in a bun at the back. In Ancient Israel, brides would wear their hair long on the wedding day as a sign of their virginity. Ordinary people and slaves, however, usually wore their hair short, mainly for hygienic reasons, since they could not afford to invest in the kind of treatment that long hair required.
- G.** From the Bible and Egyptian and Assyrian sources, as well as the words of classical authors, it appears that the centers of the trade in aromatic resins and incense were located in the kingdom of Arabia, and even as far as India, where some of these precious aromatic plants were grown. "Dealers from Sheba and Rammah dealt with you, offering the choicest spices..." (Ezekiel 27:22). The Nabateans functioned as the important middlemen in this trade; Palestine also served as a very important component, as the trade routes crisscrossed the country. It is known that the Egyptian Queen Hatsheput (15th century BC) sent a royal expedition to the Land of Punt (Somalia) in order to bring back myrrh seedlings to plant in her temple. In Assyrian records of tribute and spoils of war, perfumes and resins are mentioned; the text from the time of Tukulti-Ninurta II (890-884 BC) refers to balls of myrrh as part of the tribute brought to the Assyrian king by the Aramaean kings. The trade in spices and perfumes is also mentioned in the Bible as written in Genesis (37:25-26), "Camels carrying gum tragacanth and balm and myrrh".

Monkeys and Forests

猴子与森林

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阅读原文

AS AN EAST WIND blasts through a gap in the Cordillera de Tilaran, a rugged mountain range that splits northern Costa Rica in half, a female mantled howler monkey moves through the swaying trees of the forest canopy.

- A. Ken Glander, a primatologist from Duke University, gazes into the canopy, tracking the female's movements. Holding a dart gun, he waits with infinite patience for the right moment to shoot. With great care, Glander aims and fires. Hit in the rump, the monkey wobbles. This howler belongs to a population that has lived for decades at Hacienda La Pacifica, a working cattle ranch in Guanacaste province. Other native primates — white-faced capuchin monkeys and spider monkeys — once were common in this area, too, but vanished after the Pan-American Highway was built nearby in the 1950s. Most of the surrounding land was clear-cut for pasture.
- B. Howlers persist at La Pacifica, Glander explains, because they are leaf-eaters. They eat fruit, when it's available but, unlike capuchin and spider monkeys, do not depend on large areas of fruiting trees. Howlers can survive anywhere you have half a dozen trees, because their eating habits are so flexible,' , he says. In forests, life is an arms race between trees and the myriad creatures that feed on leaves. Plants have evolved a variety of chemical defenses, ranging from bad-tasting tannins, which bind with plant-produced nutrients, rendering them indigestible, to deadly poisons, such as alkaloids and cyanide.
- C. All primates, including humans, have some ability to handle plant toxins. "We can detoxify a dangerous poison known as caffeine, which is deadly to a lot of animals," Glander says. For leaf-eaters, long-term exposure to a specific plant toxin can increase their ability to defuse the poison and absorb the leaf nutrients. The leaves that grow in regenerating forests, like those at La Pacifica, are actually more howler friendly than those produced by the undisturbed, centuries-old trees that survive farther south, in the Amazon Basin. In younger forests, trees put most of their limited energy into growing wood, leaves and fruit, so they produce much lower levels of toxin than do well-established, old-growth trees.
- D. The value of maturing forests to primates is a subject of study at Santa Rosa National Park, about 35 miles northwest of Hacienda La Pacifica. The park hosts populations not only of mantled howlers but also of white-faced capuchins and spider monkeys. Yet the forests there are young, most of them less than 50 years old. Capuchins were the first to begin using the reborn forests, when the trees were as young as 14 years. Howlers, larger and heavier than capuchins, need somewhat older trees, with limbs that can support their greater body weight. A working ranch at Hacienda La Pacifica also explain their population boom in Santa Rosa. "Howlers are more resilient than capuchins and spider monkeys for several reasons," Fedigan explains. "They can live within a small home range, as long as the trees have the right food for them. Spider monkeys, on the other hand, occupy a huge home range, so they can't make it in fragmented habitat."

- E.** Howlers also reproduce faster than do other monkey species in the area. Capuchins don't bear their first young until about 7 years old, and spider monkeys do so even later, but howlers give birth for the first time at about 3.5 years of age. Also, while a female spider monkey will have a baby about once every four years, well-fed howlers can produce an infant every two years.
- F.** The leaves howlers eat hold plenty of water, so the monkeys can survive away from open streams and water holes. This ability gives them a real advantage over capuchin and spider monkeys, which have suffered during the long, ongoing drought in Guanacaste.
- G.** Growing human population pressures in Central and South America have led to persistent destruction of forests. During the 1990s, about 1.1 million acres of Central American forest were felled yearly. Alejandro Estrada, an ecologist at Estacion de Biologia Los Tuxtlas in Veracruz, Mexico, has been exploring how monkeys survive in a landscape increasingly shaped by humans. He and his colleagues recently studied the ecology of a group of mantled howler monkeys that thrive in a habitat completely altered by humans: a cacao plantation in Tabasco, Mexico. Like many varieties of coffee, cacao plants need shade to grow, so 40 years ago the landowners planted fig, monkey pod and other tall trees to form a protective canopy over their crop. The howlers moved in about 25 years ago after nearby forests were cut. This strange habitat, a hodgepodge of cultivated native and exotic plants, seems to support about as many monkeys as would a same-sized patch of wild forest. The howlers eat the leaves and fruit of the shade trees, leaving the valuable cacao pods alone, so the farmers tolerate them.
- H.** Estrada believes the monkeys bring underappreciated benefits to such farms, dispersing the seeds of fig and other shade trees and fertilizing the soil with feces. He points out that howler monkeys live in shade coffee and cacao plantations in Nicaragua and Costa Rica as well as in Mexico. Spider monkeys also forage in such plantations, though they need nearby areas of forest to survive in the long term. He hopes that farmers will begin to see the advantages of associating with wild monkeys, which includes potential ecotourism projects.
- I.** "Conservation is usually viewed as a conflict between agricultural practices and the need to preserve nature, " Estrada says. "We 're moving away from that vision and beginning to consider ways in which agricultural activities may become a tool for the conservation of primates in human-modified landscapes. "

阅读原文

An insight into the progress in renewable energy research

- A. The race is on for the ultimate goal of renewable energy: electricity production at prices that are competitive with coal-fired power stations, but without coal's pollution. Some new technologies are aiming to be the first to push coal from its position as Australia's chief source of electricity.
- B. At the moment the front-runner in renewable energy is wind technology. According to Peter Bergin of Australian Hydro, one of Australia's leading wind energy companies, there have been no dramatic changes in windmill design for many years, but the cumulative effects of numerous small improvements have had a major impact on cost. 'We're reaping the benefits of 30 years of research in Europe, without having to make the same mistakes that they did,' Mr. Bergin says.
- C. Electricity can be produced from coal at around 4 cents per kilowatt-hour, but only if the environmental costs are ignored. 'Australia has the second cheapest electricity in the world, and this makes it difficult for renewable to compete,' says Richard Hunter of the Australian Ecogeneration Association (AEA). Nevertheless, the AEA reports: The production cost of a kilowatt-hour of wind power is one fifth of what it was 20 years ago,' or around 7 cents per kilowatt-hour.
- D. Australian Hydro has dozens of wind monitoring stations across Australia as part of its aim to become Australia's pre-eminent renewable energy company. Despite all these developments, wind power remains one of the few forms of alternative energy where Australia is nowhere near the global cutting edge, mostly just replicating European designs.
- E. While wind may currently lead the way, some consider a number of technologies under development have more potential. In several cases, Australia is at the forefront of global research in the area. Some of them are very site-specific, ensuring that they may never become dominant market players. On the other hand, these newer developments are capable of providing more reliable power, avoiding the major criticism of windmills – the need for back-up on a calm day.
- F. One such development uses hot, dry rocks. Deep beneath South Australia, radiation from elements contained in granite heats the rocks. Layers of insulating sedimentation raise the temperatures in some location to 250° centigrade. An Australian firm, Geoenergy, is proposing to pump water 3.5 kilometres into the earth, where it will travel through tiny fissures in the granite, heating up as it goes, until it escapes as steam through another drilled hole.
- G. No greenhouse gases are produced, but the system needs some additional features if it is to be environmentally friendly. Dr Prue Chopra, a geophysicist at the Australian National University and one of the founders of Geoenergy, notes that the steam will bring with it radon gas, along through a heat exchanger and then sent back underground for another cycle. Technically speaking, hot dry rocks are not a renewable source of energy. However, the Australian source is so large it could supply the entire country's needs for thousands of years at current rates of consumption.

- H.** Two other proposals for very different ways to harness sun and wind energy have surfaced recently. Progress continues with Australian company EnviroPower's plans for Australia's first solar chimney near Mildura, in Victoria. Under this scheme, a tall tower will draw hot air from a greenhouse built to cover the surrounding 5 km². As the air rises, it will drive a turbine* to produce electricity. The solar tower combines three very old technologies – the chimney, the turbine and the greenhouse – to produce something quite new. It is this reliance on proven engineering principles that led Enviropower's CEO, Richard Davies, to state: There is no doubt this technology will work, none at all.'
- I.** This year, Enviropower recognized that the quality of sunlight in the Mildura district will require a substantially larger collecting area than was previously thought. However, spokesperson Kay Firth says that a new location closer to Mildura will enable Enviropower to balance the increased costs with extra revenue. Besides saving in transmission costs, the new site 'will mean increased revenue from tourism and use of power for telecommunications. We'll also be able to use the outer 500 metres for agribusiness.' Wind speeds closer to the tower will be too high for farming.
- J.** Another Australian company, Wavetech, is achieving success with ways of harvesting the energy in waves. Wavetech's invention uses a curved surface to push waves into a chamber, where the flowing water column pushes air back and forth through a turbine. Wavetech was created when Dr. Tim Devine offered the idea to the world leader in wave generator manufacturers, who rather surprisingly rejected it. Dr. Devine responded by establishing Wavetech, and making a number of other improvements to generator design. Wavetech claims that, at appropriate sites, the cost of electricity produced with our technology should be below 4 cents per kilowatt-hour.
- K.** The diversity of forms of greenhouse -friendly energy under development in Australia is remarkable. However, support on a national level is disappointing. According to Richard Hunter of the AEA, 'Australia has huge potential for wind, sun and wave technology. We should really be at the forefront, but the reality is we are a long way behind.'

The Ant and the Mandarin

蚂蚁和橘子

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阅读原文

- A. In 1476, the farmers of Berne in Switzerland decided there was only one way to rid their fields of the cutworms attacking their crops. They took the pests to court. The worms were tried, found guilty and excommunicated by the arch-bishop. In China, farmers had a more practical approach to pest control. Rather than relying on divine intervention, they put their faith in frogs, ducks and ants. Frogs and ducks were encouraged to snap up the pests in the paddies and the occasional plague of locusts. But the notion of biological control began with an ant. More specifically, it started with the predatory yellow citrus ant *Oecophylla smaragdina*, which has been polishing off pests in the orange groves of southern China for at least 1,700 years. The yellow citrus ant is a type of weaver ant, which binds leaves and twigs with silk to form a neat, tent-like nest. In the beginning, farmers made do with the odd ants' nests here and there. But it wasn't long before growing demand led to the development of a thriving trade in nests and a new type of agriculture - ant farming.
- B. For an insect that bites, the yellow citrus ant is remarkably popular. Even by ant standards, *Oecophylla smaragdina* is a fearsome predator. It's big, runs fast and has a powerful nip - painful to humans but lethal to many of the insects that plague the orange groves of Guangdong and Guangxi in southern China. And for at least 17 centuries, Chinese orange growers have harnessed these six-legged killing machines to keep their fruit groves healthy and productive.
- C. Citrus fruits evolved in the Far East and the Chinese discovered the delights of their flesh early on. As the ancestral home of oranges, lemons and pomelos, China also has the greatest diversity of citrus pests. And the trees that produce the sweetest fruits, the mandarins - or *kan* - attract a host of plant-eating in-sects, from black ants and sap-sucking mealy bugs to leaf-devouring caterpil-lars. With so many enemies, fruit growers clearly had to have some way of pro-tecting their orchards.
- D. The West did not discover the Chinese orange growers' secret weapon until 1 the early 20th century. At the time, Florida was suffering an epidemic of citrus canker and in 1915 Walter Swingle, a plant physiologist working for the US Department of Agriculture, was sent to China in search of varieties of orange that were resistant to the disease. Swingle spent some time studying the citrus orchards around Guangzhou, and there he came across the story of the culti-vated ant. These ants, he was told, were "grown" by the people of a small village nearby who sold them to the orange growers by the nestful.
- E. The earliest report of citrus ants at work among the orange trees appeared in a book on tropical and subtropical botany written by Hsi Han in AD 304. "The people of Chiao-Chih sell in their markets ants in bags of rush matting. The nests are like silk. The bags are all attached to twigs and leaves which, with the i ants inside the nests, are for sale. The ants are reddish-yellow in colour, bigger than ordinary ants. In the south, if the *kan* trees do not have this kind of ant, the fruits will all be damaged by many harmful insects, and not a single fruit will be perfect."
- F. Initially, farmers relied on nests which they collected from the wild or bought in the market where trade in nests was brisk. "It is said that in the south orange trees which are free of ants will have wormy fruits. Therefore, people race to buy nests for their orange trees," wrote Liu Hsun in *Strange Things Noted in the South* in about 890.

- G.** The business quickly became more sophisticated. From the 10th century, country people began to trap ants in artificial nests baited with fat. "Fruit-growing families buy these ants from vendors who make a business of collecting and selling such creatures," wrote Chuang Chi-Yu in 1130. "They trap them by filling hogs' or sheep's bladders with fat and placing them with the cavities open next to the ants' nests. They wait until the ants have migrated into the bladders and take them away. This is known as 'rearing orange ants'." Farmers attached the bladders to their trees, and in time the ants spread to other trees and built new nests.
- H.** By the 17th century, growers were building bamboo walkways between their trees to speed the colonisation of their orchards. The ants ran along these narrow bridges from one tree to another and established nests "by the hundreds of thousands".
- I.** Did it work? The orange growers clearly thought so. One authority, Chhii Ta-Chun, writing in 1700, stressed how important it was to keep the fruit trees free of insect pests, especially caterpillars. "It is essential to eliminate them so that the trees are not injured. But hand labour is not nearly as efficient as ant power..."
- J.** Swingle was just as impressed. Yet despite his reports, many Western biologists were sceptical. In the West, the idea of using one insect to destroy another was new and highly controversial. The first breakthrough had come in 1888, when the infant orange industry in California had been saved from extinction by the Australian vedalia beetle. This beetle was the only thing that had made any inroads into the explosion of cottony cushion scale that was threatening to destroy the state's citrus crops. But, as Swingle now knew, California's "first" was nothing of the sort. The Chinese had been expert in biocontrol for many centuries.
- K.** The long tradition of ants in the Chinese orchards only began to waver in the 1950s and 1960s with the introduction of powerful organic insecticides. Although most fruit growers switched to chemicals, a few hung onto their ants. Those who abandoned ants in favour of chemicals quickly became disillusioned. As costs soared and pests began to develop resistance to the chemicals, growers began to revive the old ant patrols in the late 1960s. They had good reason to have faith in their insect workforce.
- L.** Research in the early 1960s showed that as long as there were enough ants in the trees, they did an excellent job of dispatching some pests - mainly the larger insects - and had modest success against others. Trees with yellow ants produced almost 20 per cent more healthy leaves than those without. More recent trials have shown that these trees yield just as big a crop as those protected by expensive chemical sprays.
- M.** One apparent drawback of using ants - and one of the main reasons for the early scepticism by Western scientists - was that citrus ants do nothing to control mealy bugs, waxy-coated scale insects which can do considerable damage to fruit trees. In fact, the ants protect mealy bugs in exchange for the sweet honey-dew they secrete. The orange growers always denied this was a problem but Western scientists thought they knew better.
- N.** Research in the 1980s suggests that the growers were right all along. Where mealy bugs proliferate under the ants' protection, they are usually heavily parasitised and this limits the harm they can do.
- O.** Orange growers who rely on carnivorous ants rather than poisonous chemicals maintain a better balance of species in their orchards. While the ants deal with the bigger insect pests, other predatory species keep down the numbers of smaller pests such as scale insects and aphids. In the long run, ants do a lot less damage than chemicals - and they're certainly more effective than excommunication.

Tattoo on Tikopia

毛利人的传统纹身

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阅读原文

- A. There are still debates about the origins of Polynesian culture, but one thing we can ensure is that Polynesia is not a single tribe but a complex one. Polynesians which includes Marquesans, Samoans, Niueans, Tongans, Cook Islanders, Hawaiians, Tahitians, and Maori, are genetically linked to indigenous peoples of parts of Southeast Asia. It's a sub-region of Oceania, comprising of a large grouping of over 1,000 islands scattered over the central and southern Pacific Ocean, within a triangle that has New Zealand, Hawaii and Easter Island as its corners.
- B. Polynesian history has fascinated the western world since Pacific cultures were first contacted by European explorers in the late 18th century. The small island of Tikopia, for many people - even for many Solomon Islanders-- is so far away that it seems like a mythical land; a place like Namia that magical land in C. S. Lewis, classic, 'The Chronicles of Namia.' Maybe because of it — Tikopia, its people, and their cultures have long fascinated scholars, travelers, and casual observers. Like the pioneers Peter Dillion, Dumoni D'Urville and John Colledge Patterson who visited and wrote about the island in the 1800s, Raymond Firth is one of those people captured by the alluring attraction of Tikopia. As a result, he had made a number of trips to the island since 1920s and recorded his experiences, observations and reflections on Tikopia, its people, cultures and the changes that have occurred.
- C. While engaged in study of the kinship and religious life of the people of Tikopia, Firth made a few observations on their tattooing. Brief though these notes are they may be worth putting on record as an indication of the sociological setting of the practice in this primitive Polynesian community. The origin of the English word 'tattoo' actually comes from the Tikopia word 'tatau'. The word for tattoo marks in general is tau, and the operation of tattooing is known as ta tau, ta being the generic term for the act of striking.
- D. The technique of tattooing was similar throughout Polynesia. Traditional tattoo artists create their indelible tattoos using pigment made from the candlenut or kukui nut. First, they bum the nut inside a bowl made of half a coconut shell. They then scrape out the soot and use a pestle to mix it with liquid. Bluing is sometimes added to counteract the reddish hue of the carbon-based pigment. It also makes the outline of the inscribed designs bolder on the dark skin of tattooing subjects.
- E. For the instruments used when tattooing, specialists used a range of chisels made from albatross wing bone which were hafted onto a handle which was made from the heart wood of the bush and struck with a mallet. The tattooer began by sketching with charcoal a design on the supine subject, whose skin at that location was stretched taut by one more apprentices. The tattooer then dipped the appropriate points - either a single one or a whole comb into the ink (usually contained in a coconut-shell cup) and tapped it into the subject's skin, holding the blade handle in one hand and tapping it with the other. The blood that usually trickled from the punctures was wiped away either by the tattooer or his apprentice, the latter having also served by restraining a pain-wracked subject from moving, for the operation was inevitably painful a test of fortitude that tattooers sought to shorten by working as fast as possible. In fact, tattoos nearly always festered and often led to sickness - and in some cases death.
- F. In ancient Polynesian society, nearly everyone was tattooed. It was an integral part of ancient culture and was

much more than a body ornament. Tattooing indicated one's genealogy and/or rank in society. It was a sign of wealth, of strength and of the ability to endure pain. Those who went without them were seen as persons of lower social status. As such, chiefs and warriors generally had the most elaborate tattoos. Tattooing was generally begun at adolescence, and would often not be completed for a number of years. Receiving a tattoo constituted an important milestone between childhood and adulthood, and was accompanied by many rites and rituals. Apart from signaling status and rank, another reason for the practice in traditional times was to make a person more attractive to the opposite sex.

- G.** The male facial tattoo is generally divided into eight sections of the face. The center of the forehead designated a person's general rank. The area around the brows designated his position. The area around the eyes and the nose designated his hapu, or sub-tribe rank. The area around the temples served to detail one's marital status, like the number of marriages. The area under the nose displayed his signature. This signature was once memorized by tribal chiefs who used it when buying property, signing deeds, and officiating orders. The cheek area designated the nature of the person's work. The chin area showed the person's mana. Lastly, the jaw area designated a person's birth status.
- H.** A person's ancestry is indicated on each side of the face. The left side is generally the father's side, and the right side was the mother's. The manutahi design is worked on the men's back. It consists of two vertical lines drawn down the spine, with short vertical lines between them. When a man had the manutahi on his back, he took pride in himself. At gatherings of the people he could stand forth in their midst and display his tattoo designs with songs. And rows of triangles design on the men's chest indicate his bravery.
- I.** Tattoo was a way of delivering information of its owner. It's also a traditional method to fetch spiritual power, protection and strength. The Polynesians use this as a sign of character, position and levels in a hierarchy. Polynesian peoples believe that a person's mana, their spiritual power or life force, is displayed through their tattoo.

The History of Pencil

铅笔的历史

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阅读原文

- A. The beginning of the story of pencils started with a lighting Graphite. The main material for producing pencil, was discovered in 1564 in Borrowdale in England when a lightning struck a local tree during a thunder. Local people found out that the black substance spotted at the root of the unlucky tree was different from burning ash of wood. It was soft, thus left marks everywhere. Chemistry was barely out of its infancy at the time, so people mistook it for lead, equally black but much heavier. It was soon put to use by locals in marking their sheep for ownership and calculation.
- B. Britain turns out to be the major country where mines of graphite can be detected and developed. Even so, the first pencil was invented elsewhere. As graphite is soft, it requires some form of encasement. In Italy, graphite sticks were initially wrapped in string or sheepskin for stability, becoming perhaps the very first pencil in the world. then around 1560, an Italian couple made what are likely the first blueprints for the modern, wood-encased carpentry pencil. their version was a flat, oval, more compact type of pencil. their concept involved the hollowing out of a stick of juniper wood. shortly thereafter in 1662, a superior technique was discovered by German people: two wooden halves were carved, a graphite stick inserted, and the halves then glued together—essentially the same method in use to this day. The news to the usefulness of these early pencils spread far and wide, attracting the attention of artists all over the known world.
- C. Although graphite core in pencils is still referred to as lead, modern pencils do not contain lead as the "lead" of the pencil is actually a mix of finely ground graphite and clay powders. This mixture is important because the amount of clay content added to the graphite depends on the intended pencil hardness, and the amount of time spent on grinding the mixture determines the quality of the lead. the more clay you put in, the higher hardness the core has. Many pencils across the world, and almost all in Europe, are graded on the European system. this system of naming used B for black and H for hard; a pencil's grade was described by a sequence or successive Hs or Bs such as BB and BBB for successively softer leads, and HH and HHH for successively harder ones. Then the standard writing pencil is graded HB.
- D. In England, pencils continue to be made from whole sawn graphite. But with the mass production of pencils, they are getting drastically more popular in many countries with each passing decade. As demands rise, appetite for graphite soars. According to the United States Geo-Logical Survey (USGS), world production of natural graphite in 2012 was 1,100,000 tons, of which the following major exporters are: China, India, Brazil, North Korea and Canada. however, much in contrast with its intellectual application in producing pencils, graphite was also widely used in the military. During the reign of Elizabeth I, Borrowdale graphite was used as a refractory material to line moulds for cannonballs, resulting in rounder, smoother balls that could be fired farther, contributing to the strength of the English navy. this particular deposit of graphite was extremely pure and soft, and could easily be broken into sticks. Because of its military importance. this unique mine and its production were strictly controlled by

the Crown.

- E.** That the United States did not use pencils in outer space until they spent \$1000 to make a pencil to use in zero gravity conditions is in fact a fiction. It is widely known that astronauts in Russia used grease pencils, which don't have breakage problems. But it is also a fact that their counterparts in the United States used pencils in outer space before a real zero gravity pencil was invented. They preferred mechanical pencils, which produced fine lines, much clearer than the smudgy lines left by the grease pencils that Russians favored. But the lead tips of these mechanical pencils broke often. That bit of graphite floating around the space capsule could get into someone's eye, or even find its way into machinery or electronics, causing an electrical short or other problems. But despite the fact that the Americans did invent zero gravity pencils later, they stuck to mechanical pencils for many years.
- F.** Against the backdrop of a digitalized world, the prospect of pencils seems bleak. In reality, it does not. The application of pencils has by now become so widespread that they can be seen everywhere, such as classrooms, meeting rooms and art rooms, etc. A spectrum of users is likely to continue to use it into the future: students to do math work, artists to draw on sketch pads, waiters or waitresses to mark on order boards, make-up professionals to apply to faces, and architects to produce blueprints. The possibilities seem limitless.

阅读原文

It's not every scientist who writes books for people who can't read. And how many scientists want their books to look as dog-eared as possible? But Patricia Shanley, an ethnobotanist, wanted to give something back. After the poorest people of the Amazon allowed her to study their land and its ecology, she turned her research findings into a picture book that tells the local people how to get a good return on their trees without succumbing to the lure of a quick buck from a logging company. It has proved a big success.

- A. The book is called *Fruit Trees and Useful Plants in the Lives of Amazonians*, but is better known simply as the "fruit book". The second edition was produced at the request of politicians in western Amazonia. Its blend of hard science and local knowledge on the use and trade of 35 native forest species has been so well received (and well used) that no less a dignitary than Brazil's environment minister, Marina Silva, has written the foreword. "There is nothing else like the Shanley book," says Adalberto Verrisimo, director of the Institute of People and the Environment of the Amazon. "It gives science back to the poor, to the people who really need it."
- B. Shanley's work on the book began a decade ago, with a plea for help from the Rural Workers' Union of Paragominas, a Brazilian town whose prosperity is based on exploitation of timber. The union realised that logging companies would soon be knocking on the doors of the caboclos, peasant farmers living on the Rio Capim, an Amazon tributary in the Brazilian state of Para. Isolated and illiterate, the caboclos would have little concept of the true value of their trees; communities downstream had already sold off large blocks of forest for a pittance. "What they wanted to know was how valuable the forests were," recalls Shanley, then a researcher in the area for the Massachusetts-based Woods Hole Research Centre.
- C. The Rural Workers' Union wanted to know whether harvesting wild fruits would make economic sense in the Rio Capim. "There was a lot of interest in trading non-timber forest products (NTFPs)," Shanley says. At the time, environmental groups and green-minded businesses were promoting the idea. This was the view presented in a seminal paper, *Valuation of an Amazonian Rainforest*, published in *Nature* in 1989. The researchers had calculated that revenues from the sale of fruits could far exceed those from a one-off sale of trees to loggers. "The union was keen to discover whether it made more sense conserving the forest for subsistence use and the possible sale of fruit, game and medicinal plants, than selling trees for timber," says Shanley. Whether it would work for the caboclos was far from clear.
- D. Although Shanley had been invited to work in the Rio Capim, some caboclos were suspicious. "When Patricia asked if she could study my forest," says Joao Fernando Moreira Brito, "my neighbours said she was a foreigner who'd come to rob me of my trees." In the end, Moreira Brito, or Manguiera as he is known, welcomed Shanley and worked on her study. His land, an hour's walk from the Rio Capim, is almost entirely covered with primary forest. A study of this and other tracts of forest selected by the communities enabled Shanley to identify three trees, found throughout the Amazon, whose fruit was much favoured by the caboclos: bacuri (*Platonia insignis*), uxi (*Endopleura uchi*) and piquia (*Cayocas villosum*). The caboclos used their fruits, extracted oils, and knew what sort of wildlife they attracted. But, in the face of aggressive tactics from the logging companies, they had no measure of the trees' financial worth. The only way to find out, Shanley decided, was to start from scratch with a scientific study. "From a scientific point of view, hardly anything was

known about these trees," she says. But six years of field research yielded a mass of data on their flowering and fruiting behaviour. During 1993 and 1994, 30 families weighed everything they used from the forest - game, fruit, fibre, medicinal plants - and documented its source.

- E. After three logging sales and a major fire in 1997, the researchers were also able to study the ecosystem's reaction to logging and disturbance. They carried out a similar, though less exhaustive, study in 1999, this time with 15 families. The changes were striking. Average annual household consumption of forest fruit had fallen from 89 to 28 kilogrammes between 1993 and 1999. "What we found," says Shanley, "was that fruit collection could coexist with a certain amount of logging, but after the forest fire it dropped dramatically." Over the same period, fibre use also dropped from around 20 to 4 kilogrammes. The fire and logging also changed the nature of the caboclo diet. In 1993 most households ate game two or three times a month. By 1999 some were fortunate if they ate game more than two or three times a year.
- F. The loss of certain species of tree was especially significant. Shanley's team persuaded local hunters to weigh their catch, noting the trees under which the animals were caught. Over the year, they trapped five species of game averaging 232 kilogrammes under piquia trees. Under copaiba, they caught just two species averaging 63 kilogrammes; and under uxi, four species weighing 38 kilogrammes. At last, the team was getting a handle on which trees were worth keeping, and which could reasonably be sold. "This showed that selling piquia trees to loggers for a few dollars made little sense," explains Shanley. "Their local value lies in providing a prized fruit, as well as flowers which attract more game than any other species."
- G. As a result of these studies, Shanley had to tell the Rural Workers' Union of Paragominas that the Nature thesis could not be applied wholesale to their community - harvesting NTFPs would not always yield more than timber sales. Fruiting patterns of trees such as uxi were unpredictable, for example. In 1994, one household collected 3,654 uxi fruits; the following year, none at all.
- H. This is not to say that wild fruit trees were unimportant. On the contrary, argues Shanley, they are critical for subsistence, something that is often ignored in much of the current research on NTFPs, which tends to focus on their commercial potential. Geography was another factor preventing the Rio Capim caboclos from establishing a serious trade in wild fruit: villa-gers in remote areas could not compete with communities collecting NTFPs close to urban markets, although they could sell them to passing river boats.
- I. But Shanley and her colleagues decided to do more than just report their results to the union. Together with two of her research colleagues, Shanley wrote the fruit book. This, the Bible and a publication on medicinal plants co-authored by Shanley and designed for people with minimal literacy skills are about the only books you will see along this stretch of the Rio Capim. The first print ran to only 3,000 copies, but the fruit book has been remarkably influential, and is used by colleges, peasant unions, industries and the cabo-clos themselves. Its success is largely due to the fact that people with poor literacy skills can understand much of the information it contains about the non-timber forest products, thanks to its illustrations, anecdotes, stories and songs. "The book doesn't tell people what to do," says Shanley, "but it does provide them with choices." The caboclos who have used the book now have a much better understanding of which trees to sell to the loggers, and which to protect.

Graffiti-Art or Crime?

涂鸦-艺术还是犯罪

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阅读原文

- A. People love to make their mark, and graffiti such as initials or drawings written or spray-painted onto subways, walls or footpaths is a universal phenomenon. It has existed since ancient times, and one of the oldest pieces of still-existing graffiti is an advertisement for a brothel in the ancient town of Ephesus, in Greece. There are many types of graffiti, and also a variety of views about it. Some see it as an art form, some use it as a form of protest against authority, others regard it as needless and destructive vandalism, and it is often seen as the precursor of gang-related crime in a neighbourhood.
- B. The heyday of graffiti was in New York City in the 1970s. At that time, there was little money for the policing of graffiti, and artists targeted the subways and subway cars in particular. Graffiti became so popular at this time that artists wanted to identify their own particular work. They began to create distinctive stylised signatures and thus the art of tagging was born. Sales of spray paint increased significantly at this time, as more and more street artists began to explore this new medium of expression, and graffiti became bigger and more elaborate. Artists were competing to cover the whole city of New York with their work, and finally the Metro Transit Authority began to battle with graffiti artists, locking gates and removing pictures from subway trains. At the same time, graffiti began making its way into art galleries, as the established art world began to recognise it as a legitimate modern art form.
- C. By the 80s, graffiti culture in New York was beginning to decline. It was becoming associated with the local drug scene, and legal penalties for vandalism became more severe at this time. In particular, the MTA hugely increased its anti-graffiti budget, and it became much harder for artists to create elaborate pieces on subway cars, so graffiti was restricted to the streets, where it has stayed until today. By mid-1986, the 'war on graffiti' was being won, and there were fewer graffiti artists in New York. In the 90s, under mayor Rudolph Guiliani, the anti-tagging task force set out to eradicate graffiti vandals by banning sales of spray paint to under 18s and by hugely increasing fines for the offence.
- D. Of course, graffiti is not only a North American phenomenon, and there are thriving cultures throughout the world, especially in Brazil where graffiti is endemic. Some people say that the huge gap between rich and poor in the country has fuelled the growth of graffiti as a form of anonymous political protest against economic injustice. It is also becoming more common in various countries in the Middle East, probably also as a protest by people who feel marginalised or repressed by existing political regimes. In general, cities around the world have problems with graffiti artists, who are often seen by the establishment as mindless, drug-fuelled vandals.
- E. This is particularly the case with tagging, as one common use of tags is as turf markers for gangs, who use them to mark out territory in a neighbourhood. Tagging is seen as the first sign of gang activity in an area and, consequently, many cities seek to stamp it out to prevent the growth of crime and lawlessness. Common methods for fighting graffiti include banning sales of spray paint, the creation of online tagging databases, fines, and even imprisonment, but the taggers continue, seeing an arrest as a badge of honour rather than as a deterrent. At the same time, graffiti has become a recognised art form with commercial uses by companies such as Sony and even ultra-conservative IBM, which was recently fined to pay for the cleanup of a graffiti-based advertising campaign.

F. So is graffiti a form of mindless, criminal vandalism, or is it a vibrant and exciting modern art form? As with so many phenomena of modern life, this is all in the eye of the observer.

阅读原文

- A. For more than a century, Western philosophers and psychologists have based their discussions of thought patterns on one basic principle: that the same processes underlie all human thought, whether in the mountains of Tibet or the grasslands of the Africa. Cultural differences might dictate what people thought about, Teenage boys in remote areas of Africa, for example, might discuss cows with the same passion that New York teenagers reserved for sports cars, But the strategies people adopted in processing information and making sense of the world around them were. Western scholars assumed, the same for everyone.
- B. However, recent work by a social psychologist at the University of Michigan, is turning this long-held view of mental functioning upside down. In a series of studies comparing European Americans (representing Westerners) to East Asians (representing "Eastemners") Dr. Richard Nisbett and his colleagues have found that people who grow up in different cultures do not just think about different things: they think differently.
- C. Actually researchers were not the first psychological researchers to propose that thought may be embedded in cultural assumptions. For example, Soviet psychologists of the 1930's posed logic problems to Uzbek peasants, arguing that intellectual tools were influenced by pragmatic circumstances.
- D. But University of Michigan work has been of interest in academic circles because it tries to define and elaborate on cultural differences through a series of tightly controlled, empirical laboratory experiments. In the broadest sense, the Michigan studies carried out in the United States, Japan, China and Korea-document a basic contrast between East and West, and in doing so they raise questions about the assumptions of cognitive psychology that have been made for the past half a century.
- E. In one study, for example, by Dr. Nisbett and Takahiko Masuda, a graduate student at Michigan, students from Japan and the United States were shown an animated underwater scene, in which one larger "focal" fish swam among smaller fishes and other aquatic life. Asked to describe what they saw, the Japanese (or Easter) subjects were much more likely to begin by setting the scene, saying for example, "There was a lake or pond" or "The bottom was rocky, " or "The water was green." Americans (or Western). in contrast tended to begin their descriptions with the largest fish. Japanese subjects in the study made 70 percent more statements about aspects of the background environment than Americans, and twice as many statements about the relationships between animate and inanimate objects, A Japanese subject might note, for example, that "The big fish swam past the gray seaweed."
- F. And, the greater attention paid by Eastemers to context and relationship more than just superficial, the researchers found. Shown the same larger fish swimming against a different, novel background, Japanese participants had more difficulty recognizing it than Americans. This indicated that the perception of the Japanese was closely dependent upon what they saw in the background.
- G. In another study, Dr. Nisbett and Dr. Incheol Choi found that Easterners were more likely than Westerners to appreciate both sides of an argument. The researchers presented groups of Koreans and Americans with very convincing arguments in support of a particular position. Both the Koreans and the Americans at first strong support for that position. However, when the groups were then presented with arguments opposing the initial

position, the Korean subjects generally modified and decreased their support for that position, while the Americans actually increased their original support.

- H. In yet another study, again focusing on Americans and Koreans, Dr. Nisbett and Dr. Ara Norenzayan found indications that when logic and experiential knowledge are in conflict, Westerners are likely than Easterners to stick to the rules of formal logic. For example, presented with a logical sequence like, "All animals with fur hibernate. Rabbits have fur. Therefore rabbits hibernate. "The Americans were more likely to accept the validity of the series of statements. They assumed the conclusion must be true because of the logical the arguments. The Korean subjects, by contrast, more frequently judged the argument as invalid based on their own understanding that it was not actually true not all animals with fur do in fact hibernate.
- I. While the cultural disparities traced in the researchers' work are substantial, their origins are much less clear. Historical evidence suggests that a divide between Oriental and Occidental thinking has existed since ancient times. How much of this
- J. East-west difference is a result of differing social and religious practices, different languages or even different geography is anyone's guess. But both styles, Dr. Nisbett said, have advantages, and both have limitations, And neither approach is written into the genes: many Asian-Americans born in the United States are indistinguishable in their modes of thought from Americans.
- K. Anthropology Dr. Alan Fiske says, "In my field we discuss the way these different groups talk and interact. But these description are qualitative in nature rather than being controlled as an experiment would be, so Dr. Nisbett's research is a valuable complement to our work. "Yet not everyone agrees that all Dr. Nisbett's findings reflect fundamental differences in psychological process. Psychologist Dr. Patricia Cheng finds some of the findings matched some of her personal experience. But she says, "I think that some differences the Asian tolerance for contradiction, for example-are purely social Still, to the extent that the studies reflect real differences in thinking and perception, psychologists may have to develop new models of mental process that take cultural influences into account.

The Success of Cellulose

纤维素的 success

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阅读原文

- A. Not too long ago many investors made the bet that renewable fuels from bio-mass would be the next big thing in energy. Converting corn, sugarcane and soybeans into ethanol or diesel-type fuels lessens our nation's dependence on oil imports while cutting carbon dioxide emissions. But already the nascent industry faces challenges. Escalating demand is hiking food prices while farmers clear rain-forest habitats to grow fuel crops. And several recent studies say that certain biofuel-production processes either fail to yield net energy gains or release more carbon dioxide than they use.
- B. A successor tier of start-up ventures aims to avoid those problems. Rather than focusing on the starches, sugars and fats of food crops, many of the prototype bioethanol processes work with lignocellulose, the "woody" tissue that strengthens the cell walls of plants, says University of Massachusetts Amherst chemical engineer George W. Huber. Although the cellulose breaks down less easily than sugars and starches and thus requires a complex series of enzyme-driven chemical reactions, its use opens the industry to nonfood plant feed-stocks such as agricultural wastes, wood chips and switchgrass. But no company has yet demonstrated a cost-competitive industrial process for making cellulosic biofuels.
- C. So scientists and engineers are working on dozens of possible biofuel-processing routes, reports Charles Wyman, a chemical engineer at the University of California, Riverside, who is a founder of Mascoma Corporation in Cambridge, Mass., a leading developer of cellulosic ethanol processing. "There's no miracle process out there," he remarks. And fine-tuning a process involves considerable money and time. "The oil companies say that it takes 10 years to fully commercialize an industrial processing route," warns Huber, who has contributed some thermochemical techniques to another biomass start-up, Virent Energy Systems in Madison, Wis.
- D. One promising biofuel procedure that avoids the complex enzymatic chemistry to break down cellulose is now being explored by Coskata in Warrenville, Ill, a firm launched in 2006 by high-profile investors and entrepreneurs (General Motors recently took a minority stake in it as well). In the Coskata operation, a conventional gasification system will use heat to turn various feedstocks into a mixture of carbon monoxide and hydrogen called syngas, says Richard Tobey, vice president of Engineering and R&D. The ability to handle multiple plant feedstocks would boost the flexibility of the overall process because each region in the country has access to certain feedstocks but not others.
- E. Instead of using thermochemical methods to convert the syngas to fuel—a process that can be significantly more costly because of the added expense of pressurizing gases, according to Tobey—the Coskata group chose a biochemical route. The group focused on five promising strains of ethanol-excreting bacteria that Ralph Tanner, a microbiologist at the University of Oklahoma, had discovered years before in the oxygen-free sediments of a swamp. These anaerobic bugs make ethanol by voraciously consuming syngas.
- F. The "heart and soul of the Coskata process," as Tobey puts it, is the bioreactor in which the bacteria live. "Rather than searching for food in the fermentation mash in a large tank, our bacteria wait for the gas to be delivered to them," he explains. The firm relies on plastic tubes, the filter-fabric straws as thin as human hair. The syngas flows through the straws, and water is pumped across their exteriors. The gases diffuse across

the selective membrane to the bacteria embedded in the outer surface of the tubes, which permits no water inside. "We get efficient mass transfer with the tubes, which is not easy," Tobey says. "Our data suggest that in an optimal setting we could get 90 percent of the energy value of the gases into our fuel." After the bugs eat the gases, they release ethanol into the surrounding water. Standard distillation or filtration techniques could extract the alcohol from the water.

- G.** Coskata researchers estimate that their commercialized process could deliver ethanol at under \$1 per gallon-less than half of today's \$2-per-gallon wholesale price, Tobey claims. Outside evaluators at Argonne National Laboratory measured the input-output "energy balance" of the Coskata process and found that, optimally, it can produce 7.7 times as much energy in the end product as it takes to make it.
- H.** The company plans to construct a 40,000-gallon-a-year pilot plant near the GM test track in Milford, Mich., by the end of this year and hopes to build a full-scale, 100-million-gallon-a-year plant by 2011. Coskata may have some company by then; Bioengineering Resources in Fayetteville, Ark., is already developing what seems to be a similar three-step pathway in which syngas is consumed by bacteria isolated by James Gaddy, a retired chemical engineer at the University of Arkansas. Considering the advances in these and other methods, plant cellulose could provide the greener ethanol everyone wants.

New Zealand Seaweed

新西兰海藻

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阅读原文

Section A

Seaweed is a particularly nutritious food, which absorbs and concentrates traces of a wide variety of minerals necessary to the body's health. Many elements may occur in seaweed - aluminium, barium, calcium, chlorine, copper, iodine and iron, to name but a few - traces normally produced by erosion and carried to the seaweed beds by river and sea currents. Seaweeds are also rich in vita-mins: indeed, Eskimos obtain a high proportion of their bodily requirements of vitamin C from the seaweeds they eat.

The nutritive value of seaweed has long been recognised. For instance, there is a remarkably low incidence of goitre amongst the Japanese, and for that matter, amongst our own Maori people, who have always eaten seaweeds, and this may well be attributed to the high iodine content of this food. Research into old Maori eating customs shows that jellies were made using seaweeds, fresh fruit and nuts, fuchsia and tutu berries, cape gooseberries, and many other fruits which either grew here naturally or were sown from seeds brought by settlers and explorers.

Section B

New Zealand lays claim to approximately 700 species of seaweed, some of which have no representation outside this country. Of several species grown worldwide, New Zealand also has a particularly large share. For example, it is estimated that New Zealand has some 30 species of Gigartina, a close relative of carrageen or Irish moss. These are often referred to as the New Zealand carrageens. The gel-forming substance called agar which can be extracted from this species gives them great commercial application in seameal, from which seameal custard is made, and in cough mixture, confectionery, cosmetics, the canning, paint and leather industries, the manufacture of duplicating pads, and in toothpaste. In fact, during World War II, New Zealand Gigartina were sent to Australia to be used in toothpaste.

Section C

Yet although New Zealand has so much of the commercially profitable red sea-weeds, several of which are a source of agar (*Pterocladia*, *Gelidium*, *Chondrus*, *Gigartina*), before 1940 relatively little use was made of them. New Zealand used to import the Northern Hemisphere Irish moss (*Chondrus crispus*) from England and ready-made agar from Japan. Although distribution of the *Gigartina* is confined to certain areas according to species, it is only on the east coast of the North Island that its occurrence is rare. And even then, the east coast, and the area around Hokianga, have a considerable supply of the two species of *Pterocladia* from which agar is also available. Happily, New Zealand-made agar is now obtainable in health food shops.

Section D

Seaweeds are divided into three classes determined by colour - red, brown and green - and each tends to live in a specific location. However, except for the unmistakable sea lettuce (*Ulva*), few are totally one colour; and especially when dry, some species can change colour quite significantly - a brown one may turn quite black, or a

red one appear black, brown, pink or purple.

Identification is nevertheless facilitated by the fact that the factors which determine where a seaweed will grow are quite precise, and they therefore tend to occur in very well-defined zones. Although there are exceptions, the green seaweeds are mainly shallow-water algae; the browns belong to medium depths, and the reds are plants of the deeper water. Flat rock surfaces near mid-level tides are the most usual habitat of sea bombs, Venus' necklace and most brown seaweeds. This is also the location of the purple laver or Maori karengo, which looks rather like a reddish-purple lettuce. Deep-water rocks on open coasts, exposed only at very low tide, are usually the site of bull kelp, strap weeds and similar tough specimens. Those species able to resist long periods of exposure to the sun and air are usually found on the upper shore, while those less able to stand such exposure occur nearer to or below the low-water mark. Radiation from the sun, the temperature level, and the length of time immersed all play a part in the zoning of seaweeds.

Section E

Propagation of seaweeds occurs by spores, or by fertilisation of egg cells. None have roots in the usual sense; few have leaves, and none have flowers, fruits or seeds. The plants absorb their nourishment through their fronds when they are surrounded by water: the base or "holdfast" of seaweeds is purely an attaching organ, not an absorbing one.

Section F

Some of the large seaweeds maintain buoyancy with air-filled floats; others, such as bull kelp, have large cells filled with air. Some, which spend a good part of their time exposed to the air, often reduce dehydration either by having swollen stems that contain water, or they may (like Venus' necklace) have | swollen nodules, or they may have distinctive shape like a sea bomb. Others, like the sea cactus, are filled with slimy fluid or have coating of mucilage on % the surface. In some of the larger kelps, this coating is not only to keep the plant moist but also to protect it from the violent action of waves.

Andrea Palladio: Italian Architect

意大利建筑大师

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阅读原文

A new exhibition celebrates Palladio's architecture 500 years on.

- A. Vicenza is a pleasant, prosperous city in the Veneto, 60 km west of Venice. Its grand families settled and farmed the area from the 16th century. But its principal claim to fame is Andrea Palladio, who is such an influential architect that a neoclassical style is known as Palladian. The city is a permanent exhibition of some of his finest buildings, and as he was born in Padua, to be precise-500 years ago, the International Centre for the Study of Palladio's Architecture has an excellent excuse for mounting *la grande mostra*, the big show.
- B. The exhibition has the special advantage of being held in one of Palladio's buildings, Palazzo Barbaran da Porto. Its bold facade is a mixture of rustication and decoration set between two rows of elegant columns. On the second floor the pediments are alternately curved or pointed, a Palladian trademark. The harmonious proportions of the atrium at the entrance lead through to a dramatic interior of fine fireplaces and painted ceilings. Palladio's design is simple, clear and not over-crowded. The show has been organised on the same principles, according to Howard Burns, the architectural historian who co-curated it.
- C. Palladio's father was a miller who settled in Vicenza, where the young Andrea was apprenticed to a skilled stonemason. How did a humble miller's son become a world renowned architect? The answer in the exhibition is that, as a young man, Palladio excelled at carving decorative stonework on columns, doorways and fireplaces. He was plainly intelligent, and lucky enough to come across a rich patron, Gian Giorgio Trissino, a landowner and scholar, who organised his education, taking him to Rome in the 1540s, where he studied the masterpieces of classical Roman and Greek architecture and the work of other influential architects of the time, such as Donato Bramante and Raphael.
- D. Burns argues that social mobility was also important. Entrepreneurs, prosperous from agriculture in the Veneto, commissioned the promising local architect to design their country houses, and Palladio was given the chance to design the buildings that have made him famous. In Venice the aristocracy were anxious to co-opt talented architects, and the churches of San Giorgio Maggiore and the Redentore, both easy to admire because they can be seen from the city's historical centre across a stretch of water.
- E. He tried his hand at bridges-his unbuilt version of the Rialto Bridge was decorated with the large pediment and columns of a temple-and, after a fire at the Ducal Palace, he offered an alternative design which bears an uncanny resemblance to the Banqueting House in Whitehall in London. Since it was designed by Inigo Jones, Palladio's first foreign disciple, this is not as surprising as it sounds.
- F. Jones, who visited Italy in 1614, bought a trunk full of the master's architectural drawings; they passed through the hands of the Dukes of Burlington and Devonshire before settling at the Royal Institute of British Architects in 1894. Many are now on display at Palazzo Barbaran. What they show is how Palladio drew on the buildings of ancient Rome as models. The major theme of both his rural and urban building was temple architecture, with a strong pointed pediment supported by columns and approached by wide steps.
- G. Palladio's work for rich landowners alienates unreconstructed critics on the Italian left, but among the papers in the show are designs for cheap housing in Venice. In the wider world, Palladio's reputation has been nurtured

by a text he wrote and illustrated, "Quattro Libri dell Architettura". His influence spread to St Petersburg and to Charlottesville in Virginia where Thomas Jefferson commissioned a Palladian villa he called Monticello.

- H. Vicenza's show contains detailed models of the major buildings and is leavened by portraits of Palladio's teachers and clients by Titian, Veronese and Tintoretto: the paintings of his Venetian buildings are all by Canaletto, no less. This is an uncompromising exhibitions many of the drawings are small and faint, and there are no sideshows for children, but the Impact of harmonious lines and satisfying proportions is to impart in a viewer a feeling of benevolent calm. Palladio is history's most therapeutic architect.
- I. "Palladio, 500 Anni: *La Grande Mostra*" is at Palazzo Barbaran da Porto, Vicenza, until January 6th 2009. The exhibition continues at the Royal Academy of Arts, London, from January 31st to April 13th, and travels afterwards to Barcelona and Madrid.

History of theaters in Britain

英国剧院的历史发展

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阅读原文

- A. British theatre has a rich history, from playwrights like William Shakespeare to actors like Laurence Olivier. Today audiences still love to go to the theatre to be entertained and challenged, hearing ideas that may not be expressed anywhere else.
- B. But it wasn't always like that. Initially theatre was used by the church and royalty to spread their ideas. Gradually it became a vehicle to make everyone's voice heard. So how did this come about?
- C. During the upheaval of the medieval period the church used religious stories as a way of controlling and distracting the country.
- D. Theatre essentially grew out of this religious storytelling. Entertaining the public became necessary especially after the trauma of the Black Death. Plays took the form of mystery cycles and miracle plays. Mystery cycles dramatised stories from the Bible, while miracle plays told stories about the lives of saints. Parishes created these plays in order to communicate moral lessons to society. Through these organised performances, the concept of theatre began to take root in Britain. After centuries of religious inspiration for theatre, Henry VIII banned all religious performances to prevent plays from spreading Catholicism. He had set up his own church – the Church of England – and demanded his people follow this faith instead. Post Reformation plays instead aimed to entertain influential people and foreign VIPs. Theatre flourished in the 16th Century and The Theatre, one of the first purpose- built playhouses, opened its doors in London in 1576.
- E. After the English Civil War, theatres experienced more restrictions. King Charles II saw theatre as a way to establish control over the country. While in exile he saw how Louis XIV managed and controlled French theatre and Charles copied his approach by issuing royal patents to just two theatres. This restricted dramatic opportunity as only these two could perform serious drama and the remaining theatres had to perform comedy or melodrama instead. Patented theatre became known as legitimate theatre and non-patented theatre as illegitimate theatre. But progress was seen when Margaret Hughes became the first woman on stage in 1660.
- F. Despite the restrictions of the royal patents, theatre began to satirise the government. In response politicians tightened theatrical censorship. Tipped over the edge by plays attempting to ridicule him, Robert Walpole, the first ever Prime Minister, introduced the 1737 Licensing Act. It gave the Lord Chamberlain – a senior government adviser - the power to stop plays being performed. With dramatic creativity effectively stifled, writers turned to novels or illegitimate theatre for creative freedom. Despite an amendment in 1843, the act remained in place and in use until 1968.
- G. Ten years later, David Garrick's theatrical innovations marked the point when actors, writers and other theatre makers began to take control. David Garrick was an actor and manager who introduced sweeping changes. Actors were subjected to new and intensive rehearsal techniques and audiences were discouraged from sitting on the stage, as the rich used to do. He was also a champion of Shakespeare and his debut performance on the London stage as Richard III made him an overnight star. Garrick was responsible for radical stylistic advances in acting. He brought more emotion and realism to the exaggerated expressions of the time.

- H.** In the Victorian era theatre's popularity meant the patent system no longer worked. So it was ended in 1843 allowing more opportunities in drama. TW Robertson was one playwright to benefit from this. He presented the audience with realistic sets, everyday stories and natural dialogue. His representations of domestic realism became known as 'cup and saucer dramas': one of his greatest successes was *Caste*, a play about rank and social classes. The end of the patent system allowed theatre to develop artistically. It set the stage for playwrights such as Oscar Wilde who like Robertson tended to focus on the lives of the privileged.
- I.** Interest in the arts grew in post-war Britain and audiences were keen to see stories that they identified with. 'Kitchen sink' dramas provided them. Almost a century on from Robertson's naturalist plays, this new style of play, showed working class life in a level of detail that was still unusual. *Men Should Weep* by Ena Lamont Stewart premiered in 1947 and told a bleak tale of poverty in 1930s Glasgow. Also in the 1950s writers like John Osborne and Shelagh Delaney were acclaimed for the social realism of their work. The success of Lamont Stewart and Delaney helped pave the way for other women to make their voices heard on the stage.
- J.** During the 20th Century, more changes happened off stage when the role of the director became the key creative force. The notion of a directors' theatre began in Europe and spread to Britain. Sir Peter Hall is one of Britain's most celebrated directors. In 1955 he directed the first English language production of Samuel Beckett's *Waiting for Godot*, which cemented his reputation. His vision also created the blueprint for the Royal Shakespeare Company, a defining moment in British theatre history. Despite his creative innovations he was still restricted by the censorship laws.
- K.** By the swinging 60s, not only was the power of theatre in the hands of theatre makers, but it had begun to challenge authority.
- L.** Until it ended in 1968 theatres avoided the constraints of government censorship by trading as private clubs. The freedom this gave them allowed much more challenging and radical subject matter to be tackled. Plays such as Sartre's *Huis Clos* – which was set in Hell and featured a homosexual character – were staged. One of the leading theatres of this movement was Edinburgh's Traverse theatre.
- M.** As the 21st Century dawned, theatre continued to evolve as a vehicle for challenging the establishment and pushing boundaries. *Black Watch*, which premiered at the 2006 Edinburgh Festival Fringe, told the story of the Iraq War through the eyes of soldiers from the Black Watch regiment. The play did exactly what the government feared in 1737 and challenged those in power by holding British politicians accountable for the suffering of the soldiers. It was theatre at its controversial and arresting best – a far cry from the restrictive and controlling theatre of the past.
- N.** While playwrights have more freedom than ever before, some issues around race and religion have proved problematic for theatres to navigate. Religious outrage forced the closure of *Behzti* at the Birmingham Repertory Theatre in 2004. The play sparked riots due to the staging of a rape and murder in a Sikh temple. And in 2015 a National Youth Theatre play called *Homegrown*, about Islamic radicalisation in a London school, was cancelled days before opening. But despite the difficulties, British theatre continues to reflect modern life, telling stories and challenging taboos.

Motivating Drives

员工激励措施

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阅读原文

A. Scientists have been researching the way to get employees motivated for many years. This research in a relational study which builds the fundamental and comprehensive model for study. This is especially true when the business goal is to turn unmotivated teams into productive ones. But their researchers have limitations. It is like studying the movements of car without taking out the engine.

B. Motivation is what drives people to succeed and plays a vital role in enhancing an organizational development. It is important to study the motivation of employees because it is related to the emotion and behavior of employees. Recent studies show there are four drives for motivation. They are the drive to acquire, the drive to bond, the drive to comprehend and the drive to defend.

The Drive to Acquire

C. The drive to acquire must be met to optimize the acquire aspect as well as the achievement element. Thus the way that outstanding performance is recognized, the type of perks that is provided to polish the career path. But sometimes a written letter of appreciation generates more motivation than a thousand dollar check, which can serve as the invisible power to boost business engagement. Successful organizations and leaders not only need to focus on the optimization of physical reward but also on moving other levers within the organization that can drive motivation.

The Drive to Bond

D. The drive to bond is also key to driving motivation. There are many kinds of bonds between people, like friendship, family. In company, employees also want to be an essential part of company. They want to belong to the company. Employees will be motivated if they find personal belonging to the company. In the meantime, the most commitment will be achieved by the employee on condition that the force of motivation within the employee affects the direction, intensity and persistence of decision and behavior in company.

The Drive to Comprehend

E. The drive to comprehend motivates many employees to higher performance. For years, it has been known that setting stretch goals can greatly impact performance. Organizations need to ensure that the various job roles provide employees with simulation that challenges them or allow them to grow. Employees don't want to do meaningless things or monotonous job. If the job didn't provide them with personal meaning and fulfillment, they will leave the company.

The Drive to Defend

F. The drive to defend is often the hardest lever to pull. This drive manifests itself as a quest to create and promote justice, fairness, and the ability to express ourselves freely. The organizational lever for this basic human motivator is resource allocation. This drive is also met through an employee feeling connection to a company. If their companies are merged with another, they will show worries.

- G.** Two studies have been done to find the relations between the four drives and motivation. The article based on two studies was finally published in Harvard Business Review. Most authors' arguments have laid emphasis on four-drive theory and actual investigations. Using the results of the surveys which executed with employees from Fortune 500 companies and other two global businesses (P company and H company), the article mentions about how independent drives influence employees' behavior and how organizational levers boost employee motivation.
- H.** The studies show that the drive to bond is most related to fulfilling commitment, while the drive to comprehend is most related to how much effort employees spend on works. The drive to acquire can be satisfied by a rewarding system which ties rewards to performances, and gives the best people opportunities for advancement. For drive to defend, a study on the merging of P company and H company shows that employees in former company show an unusual cooperating attitude.
- I.** The key to successfully motivate employees is to meet all drives. Each of these drives is important if we are to understand employee motivation. These four drives, while not necessarily the only human drives, are the ones that are central to unified understanding of modern human life.