

先锋英语

Explorer English

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英语学习 系列读物 · 立足科技的特色英语丛书



Smile: Men vs Women

男女笑不同

The Lines of Peru
秘鲁线条

What Is SARS
SARS面对面

America's Goofiest Patents
专利局里的哈哈发明

Here They Are,



Science's 10 Most Beautiful Experiments

“最美丽”的十大物理实验

最近，一位美国历史学家在本国的物理学家中作了一次调查，要求他们提名历史上最美丽的科学实验，《物理学世界》杂志随后刊登了前10位的排名。令人惊奇的是，这些经典之作绝大多数是由科学家独立完成的，最多有一两个助手。所有的实验都是在实验桌上进行的，也没有用到什么大型计算工具，比如电脑，最多不过是把直尺或者是计算器。

所有这些实验的共同之处是：它们都紧紧“抓”住了物理学家眼中“最美丽”的科学之魂。这种美丽是一种经典概念：最简单的仪器和设备，最根本、最单纯的科学结论。它们就像是一座座历史丰碑，将人们长久的困惑和含糊顷刻间一扫而空，使人们对自然界的认识更加清晰。

以下是《物理学世界》刊出的排名。我们将按时间的先后顺序逐一刊登，以飨读者。



1 Young's double-slit experiment applied to the interference of single electrons (1961)

托马斯·杨的双缝演示应用于电子干涉实验

2 Galileo's experiment on falling bodies (1600s)

伽利略的自由落体实验

3 Millikan's oil-drop experiment (1910s)


罗伯特·米利肯的油滴实验

4 Newton's decomposition of sunlight with a prism (1665 — 1666)

牛顿的棱镜分解太阳光实验

5 Young's light-interference experiment (1803)

托马斯·杨的光干涉实验



6 Cavendish's torsion-bar experiment (1798)

卡文迪许的扭矩实验

7 Eratosthenes' measurement of the Earth's circumference (3rd century BC)

埃拉托色尼测量地球圆周

8 Galileo's experiments with rolling balls down inclined planes (1600s)

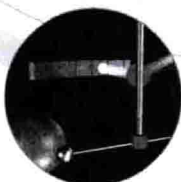
伽利略的加速度实验

9 Rutherford's discovery of the nucleus (1911)

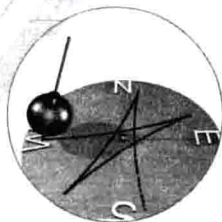
卢瑟福发现核子实验

10 Foucault's pendulum (1851)

米歇尔·傅科的钟摆实验



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Eratosthenes' Measurement of the Earth's Circumference

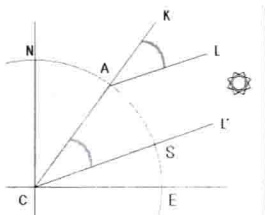
埃拉托色尼测量地球圆周长

At noon on the summer solstice in the Egyptian town now called Aswan, the sun hovers straight overhead: objects cast no shadow and sunlight falls directly down a deep well. When he read this fact, Eratosthenes, the librarian at Alexandria in the 3rd century B.C., realized he had the information he needed to estimate the circumference of the planet. On the same day and time, he measured shadows in Alexandria, finding that the solar rays there had a bit of a slant, deviating from the vertical by about seven degrees.

The rest was just geometry. Assuming the earth is spherical, its circumference spans 360 degrees. So if the two cities are seven degrees apart, that would constitute seven-360ths of the full circle — about one-fiftieth. Estimating from travel time that the towns were 5,000 "stadia"² apart, Eratosthenes concluded that the earth must be 50 times that size — 250,000 stadia in girth. Scholars differ over the length of a Greek stadium, so it is impossible to know just how accurate he was. But by some reckonings, he was off by only about 5 percent. (Ranking: 7) ■

在古埃及的一个现名阿斯旺的小镇上，夏至日正午的太阳端正地挂在头顶：物体没有影子，阳光直射入一口深水井中。看到这一现象，公元前3世纪亚历山大图书馆的馆长埃拉托色尼意识到自己得到了估计地球周长所需的资料。同一天的同一时刻，他在亚历山大测量了影子的长度，发现太阳光线在这里有轻微的倾斜，偏离垂直方向大约7度角。

剩下的就只是几何学问题了。假设地球是球状，那么它的周沿应跨越360度。如果两座城市相差7度角，就是 $7/360$ 即约 $1/50$ 的圆周。根据来往两地之间所需时间计算出两地之间的距离应为5,000个运动场的长度。埃拉托色尼由此得出结论：地球周长为两地之间距离的50倍，即25万个运动场的长度。由于学者们对于古希腊运动场的长度有所分歧，因此无法知道埃拉托色尼计算的精确度。但根据一些测算，其误差率仅约5%。（排名第七）■



1. Eratosthenes: 埃拉托色尼 (276? - 194? B.C.) 古希腊天文学家、数学家和诗人，首次测量出地球周长和黄赤交角，并编制了一本星表。

2. stadia: stadium 的复数形式。

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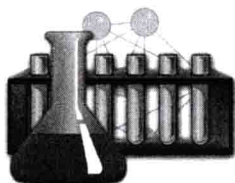
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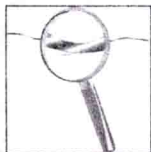
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Key to Controlling Hair Growth Discovered

毛发生长的奥秘



The process that controls hair formation has been identified by U.S. scientists, giving new hope to people with too little in the right place or too much in the wrong place.

The researchers of Rockefeller University in New York, report in *Nature* on the discovery of a gene network which regulates the amount of "glue" between skin cells. The Rockefeller group was led by Professor Elaine Fuchs, a recognised expert on the genetics of skin and hair development.

Hair follicles can only form once the glue is loosened. This allows the cells to reposition and form a bud, which can then change its structure and grow into a hair follicle. Epithelial stem cells can then either develop into the epidermis or nerve cells.

While the study has identified the genes required for the onset of hair follicle formation, there is still some way to go before a cure for baldness is found. The mechanism that determines whether the bud becomes a hair follicle, a sweat gland or a mammary gland is not understood, and further research is underway. ■

日前，美国的科学家们已经发现了控制毛发生长过程的奥秘，这项研究成果为因毛发而苦恼的人们带来了新的希望。他们的苦衷在于该长的地方毛发太少，不该长的地方却太多。

纽约洛克菲勒大学的研究人员发现了一个控制皮肤细胞之间“胶水”含量的基因网，并将研究结果发表在《自然》杂志上。这个研究小组由伊莱恩·富舒教授领导，她是研究皮肤和毛发生长基因学领域里公认的专家。

只有在连接皮肤细胞的胶水粘合力下降时，毛囊才会形成，细胞才能调整位置，形成“芽体”。之后“芽体”会改变结构，形成一个毛囊。表皮干细胞则发展成表皮或神经细胞。

虽然控制毛囊形成所需的基因已经被发现，但是治疗秃顶还需要进一步的研究。决定“芽体”是转变为毛囊，还是汗腺或乳腺的机制也不十分清楚，深入的研究还在进行中。■

Dog Translation Device Coming to U.S.

明明白白“我”的心



A Japanese toy maker claims to have developed a gadget that translates dog barks into human language and plans to begin selling the product — under the name *Bowlingual* — in U.S. pet stores, gift shops and retail outlets this summer.

Tokyo-based Takara Co., Ltd. says about 300,000 of the dog translator devices have been sold since its launch in Japan late last year. It is forecasting far bigger sales once an English-language version comes to America in August. The United States is home to about 67 million dogs, more than six times the number in Japan.

"We know that the Americans love their dogs so much, so we don't think they will mind spending \$120 on this product," the Takara marketing manager said during an interview at a recent pet products convention in Atlanta.

Cited as one of the coolest inventions of 2002 by *Time* magazine, *Bowlingual* consists of a 3-inch long wireless microphone that attaches to a dog collar and transmits sounds to a palm-sized console that is linked to a database. The console classifies each woof, yip or whine into six emotional categories — happiness, sadness, frustration, anger, menace and desire — and displays common phrases, such as "You're ticking me off," that fit the dog's emotional state.

Takara says it has spent hundreds of millions of yen developing the device in cooperation with acoustics experts and animal behaviorists.

One thing that does appear certain is that the market for animal translation products will likely remain a dog's world since Takara has no plans to develop a similar device for cats. "They are too unpredictable," the marketing manager said. ■

日本的玩具制造商称他们开发了一个精巧的装置，它可以将狗的叫声“翻译”成人类的语言。目前，他们已经决定从今年夏天开始以“*Bowlingual*”的名字在美国的宠物商店、礼品店和零售店出售该产品。

总部位于东京的Takara株式会社说仅去年下半年，在日本就售出了30万台狗语翻译机。一旦8月份英文版的狗语翻译机进入美国市场，预计一定会有更大的销售量。要知道美国家庭共有6,700万只狗，数量是日本的6倍多。

最近，在亚特兰大举行的一次宠物产品展会上，Takara株式会社市场部经理接受采访时说：“我们都知道美国人非常爱他们的狗，所以我们认为他们是不会介意花上120美元买这种产品的。”

被《时代》杂志评选为2002年“最佳发明”的*Bowlingual*由一个3英寸长的无线麦克风组成，这个麦克风装在狗的项圈上，它可以将声音传到一个手掌大小的控制器上，控制器又同同一个数据库相连。控制器仔细地区分每一个呜呜的低鸣声，尖声狂吠和哀鸣，将它们分为6种感情模式：快乐、悲伤、失望、气愤、威胁和需求，并显示出一些常用短语表达小狗当时的情感状态，例如“你实在让我太恼火了。”

Takara株式会社说，他们的研发投资达数亿日元，并得到了声学专家和动物行为学家们的大力协助。

无论怎样，可以肯定的是动物翻译产品暂时依然是狗的天下，因为Takara株式会社不打算研制类似的猫语翻译机。市场部经理说：“它们（猫）实在是太难捉摸了。” ■

Smile: Men vs Women

男女笑不同



Women do smile more than men, but when occupying similar work and social roles, the gender differences in the rate of smiling disappear, a Yale researcher has found. Also, there are large differences in the degree to which men smile less than women depending on a person's culture, ethnicity and age.

"It would be interesting for social psychologists and anthropologists to look at these data because the wide cultural, ethnic and other differences suggest that the sex difference is not something that is hard-wired," said one of the researchers. This is not a function of being male or female. Each culture overlays men and women with rules about appropriate behavior.

The researchers set out to examine every available study that has been done on sex differences in smiling. Ultimately, they looked at 186 research reports. They found "the difference is there, but it's not whopping".

Besides the difference between the sexes, the rate at which men and women smile also changes with the different backgrounds, such as ethnicity, age and culture.

Men and women also smile about the same amount when they are in the same position in terms of power, occupation or social role. The researchers surmise that the sex differences are overridden by smile norms for the role one is in.

However, when there is tension in the air, women more often than men try to diffuse it with a smile. Women do what we call "emotion work" and one of the best ways to do this is to smile to soothe hurt feelings, to restore harmony. ■

耶鲁大学的一位研究人员发现,女人笑的次数确实比男人多,但是当从事相似的工作或是扮演相似的社会角色时,这种因性别不同而引起的微笑次数的差别也会消失。而且,男人比女人笑得少的程度因文化、种族和年龄的差异而有很大的不同。

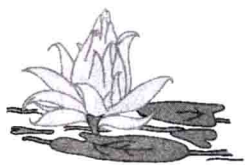
一位研究人员说:“对于社会心理学家和人类学家来说,看看这些研究数据将非常有趣,因为文化、种族以及其他方面的巨大差异表明性别差异与笑的次数多少并无必然联系。”这并不是身为男人和女人所决定的。每一种文化都对男人和女人的举止做了规定。

研究人员尽力研究了每一份能获得的有关性别差异对笑产生影响的资料。在研究了186份研究报告后,他们发现两性之间笑的次数“确实有差别,但是并不十分明显”。

除了性别的差异外,笑的次数多少还因人们不同的背景,如种族、年龄和文化而各异。

当男人和女人在权利、职业和社会角色上地位相当时,他们笑的次数也差不多相同。研究人员推测,人们所扮演的角色对笑的需求优先于性别差异(影响笑的次数)。

然而,当气氛紧张时,女人会更频繁地用笑容予以缓解。她们所做的被称为“情感工作”,而抚慰受伤感情,恢复融洽气氛的最好的一种方式就是微笑。■



Leaf Secret Inspires Self-cleaning Paint

清洁 DIY

A self-cleaning paint inspired by lotus leaves is being developed by Australian researchers. A paint compound is designed to prevent dirt from sticking to its surface.

According to the leader of the researchers, the initial inspiration for the paint came from nature. One researcher noticed that while lotus plants live in water, water never sticks to their leaves, "We asked 'Can we mimic this property?'"

Plant leaves keep clean because a thin, and slightly bumpy, coating of wax on them enables rain to easily wash the dirt from them. The team have mimicked the natural cleaning action of water on leaves by creating a synthetic compound, which is designed to decrease the strength of the bond between dirt and the surface of paint.

The concept is yet to undergo a lot of testing. "Testing needs to be done outside and in certain conditions, and under certain temperatures," the researchers said.

If it proves itself, the new paint compound is designed to become part of the normal mixture of paint chemicals which include solvent, pigment and oxidants. The paint could be used on house exteriors, cars, road signs and billboards which would then be washed clean any time it rained. It could also make food surfaces easier to wash. ■

最近，澳大利亚的研究人员受莲叶的启发研制了一种可以“自洁”的新型涂料。这种新型涂料复合物可以防止污物粘在涂料的表面。

领导这个研究小组的科学家说这种涂料最初的灵感来源于自然界。一位研究人员注意到，尽管莲花长在水中，莲叶却不会沾水。“于是我们就问自己：‘我们可以模仿这种特性吗？’”

植物的叶子始终保持清洁是因为在叶子的表面有一层很薄，轻微隆起的蜡膜，这层蜡膜使雨水很容易将叶子表面的污物冲洗干净。研究小组模仿水清洁叶子的过程，研制了这种涂料复合物，它可以降低污物和涂料表面的粘合力。

这种想法还需要经过许多测试。研究人员说：“测试要在户外、某些特定条件以及某些特定的温度下分别进行。”

如果这种涂料通过了测试，这种新型的涂料复合物就可以成为制造化学涂料的常规化学混合物之一，这些化学物质包括溶剂、色素和抗氧化剂。这种涂料可用于房屋的外墙面、车身、路标和布告栏上，这样只要一下雨这些地方就被冲洗干净了；也可以将这种涂料用于食品的表面使其更易清洗。■

Robot Finger Has Feeling



手下有“情”



Scientists in Spain have developed a robotic finger with a sense of touch. It is made of a polymer that can feel the weight of what it's pushing and adjust the energy it uses accordingly.

This is similar to the way we use our sense of touch. If we pick up a delicate object such as a flower, our fingertips sense its fragility and so grasp it lightly. We instinctively exert more force when holding or moving a heavier, more robust item because there is feedback between our sensations and muscles.

One way to make an artificial touch-sensitive limb, therefore, would be to equip it with delicate pressure sensors to provide this sort of feedback.

Called polypyrrole, it expands in response to electric current and conducts differently in response to changes in pressure. So the bending motion uses electrical energy.

The researchers figure that this adjustment happens because of the way the film stuck with polymer is squeezed against the obstacle. Pressure changes the packing of the polymer molecules, which alters the voltage needed to make it bend. In effect, the finger "feels" the resistance that its motion encounters. ■

西班牙的科学家已经发明了一个有触感的机器手指。它由一种聚合物制造而成，这种聚合物可以使机器手指感受到正在推动的物体的重量，并且相应地调节其使用的力量。

这和我们人类使用触觉的方式大致相似。如果我们拿起一个很精巧的物体，比如一朵花，我们的手指感觉到它的纤细，因而就格外轻柔。拿起或移动的物体越重、越结实，我们也会不由自主地使出更大的劲儿。因为在我们的感觉和肌肉之间存在一种反馈。

因此，制造一种有触觉的肢体的一个方法就是给肢体配备超精度压力传感器，从而建立这种反馈。

这种聚合物名为“聚吡咯 (polypyrrole)”，它可以根据电流的变化改变形状，并根据压力的改变做出不同反应。因此整个弯曲的过程需耗费一定的电能。

发明人员解释说，机械手指之所以能够根据物体的重量来调节使用的力度，是因为粘有聚合物的薄膜在弯曲的时候遇到来自物体的阻碍。压力改变了聚合物分子的排列，从而改变了使机器手指弯曲所需要的电压。事实上，机器手指感受的是它们活动时所遇到的阻力。■



木乃伊的证据



Egyptian archaeologists have opened a 5,000-year-old wooden coffin in the desert near Cairo to find a pile of bones which they said showed the oldest evidence yet found of human mummification in Egypt.

The bones were covered with a resin used in the mummification process and remnants of skin. "This is...the oldest evidence of mummification in Egypt," Egyptian antiquities chief said.

The coffin was found in one of more than 20 mud-brick tombs, which belonged to officials who had lived between 3100 — 2890 BC under Egypt's 1st Dynasty. "We are continuing our excavations to reveal more about the tombs of the officials who ruled Egypt under the kings of dynasty one."

Egyptian mummification techniques developed over the centuries. Ancient Egyptians are known to have embalmed bodies between 2613 and 2494 BC. Methods used between 1567 — 1200 BC were the most effective at preserving dead and the remains of King Ramses II, who ruled during that period, have been displayed at the Egyptian Museum. Techniques used between 1085 — 945 BC were the most elaborate, when the dried, washed and wrapped body was strapped with cloth for protection and covered with jewellery to ward off evil. ■

埃及的考古学家在开罗附近的沙漠里发现了一个有5,000年历史的木棺，他们认为其中的骸骨是人们迄今发现的有关埃及木乃伊制作术最古老的证据。

这堆骸骨的表面覆以制造木乃伊时用到的松香和残余的皮肤。埃及古文物负责人说：“这是我们所发现的埃及木乃伊制作最古老的证据。”

科学家们在—座砖泥坟墓中发现了这口棺木。这是20座砖泥坟墓群中的一座，墓群是埃及第一代王朝的官员们的陵墓，他们生活的年代大约在公元前3100年到公元前2890年之间。“我们正在继续挖掘，希望能发现更多当时执政的官员们坟墓的情况。”

埃及的木乃伊制作技术经历了几个世纪的发展历程。我们知道，早在公元前2613和公元前2494年间，古埃及人就对尸体进行防腐处理。而公元前1567年到公元前1200年之间所用的方法尤为有效，它成功地保存了当时执政的拉美西斯二世的遗体，现在这具木乃伊作为展品在埃及博物馆展出。公元前1085年到公元前945年之间，木乃伊制作术最为精湛：尸体先经脱水，洗净，缠裹后还要用布将其捆好以达到保护的目的，并覆盖珠宝首饰辟邪。■

Slim Screen Can Be Rolled

电子纸张大放异彩



One newspaper that updates itself with the latest headlines every day — that's the vision of US researchers who have unveiled an ultra-thin electronic-ink display screen.

The screen is less than 0.3 millimetres thick, flexible enough to be rolled into a tube and can be viewed from almost any angle.

This is good, but not quite good enough for an e-newspaper, admits the device's creator, Yu Chen of the E Ink Corporation in Cambridge, Massachusetts: the display is still too thick to be folded in two.

The screen uses an electronic network called a thin-film transistor array. This can supply opposing voltages to different areas of the display. On top of the array is a conducting layer containing millions of tiny capsules of charge-sensitive pigment — some black, some white. A negative voltage moves the white particles to the surface; a positive one brings black ones to the fore, creating an effect like print on a page. The pattern remains for around 10 minutes after the voltages are removed, making this a cheaper alternative to other electronic displays.

Similar technology could even make clothes into video screens. This would need a display that refreshed itself every 15 milliseconds. The new screen currently takes around a quarter of a second. "The main challenge is to increase the speed — I think it's very doable," the creator says. ■

美国研究人员公开展示了一幅超薄电子墨水显示屏，他们期望能进一步研制出一份每天自动显示最新消息的报纸。

这个屏幕的厚度不足 0.3 毫米，相当柔软，可以卷成一个圆筒，并几乎可以从任意角度观看。

这已经相当不错了。但是，它的发明人、马萨诸塞州剑桥市 E Ink 公司的陈羽（音）认为，这个屏幕用于电子报纸仍嫌美中不足，因为它还是太厚，不能对折。

这个屏幕使用了一种被称为薄膜晶体管阵列的电子网络。它能够为显示屏的不同区域提供交变电压。在阵列的顶端是一个导电层，其中含有数百万个电感色素微囊，有白色和黑色两种：电压为负时，白色出现在屏幕表面，电压为正时，黑色就出现在屏幕表面，由此产生了与在纸张上打印相似的效果。电压消失后，形成的图案还可以持续大约 10 分钟，因此相较于其他电子显示技术这种方法更便宜。

类似的技术甚至可以将衣服变成影像屏。这就需要有一个每 15 毫秒更新一次的显示器，而目前的显示屏更新一次需要 0.25 秒（250 毫秒）。陈羽说：“目前最艰巨的任务就是要提高速度，我认为（通过实验）这是可以达到的。” ■

World Cup Win Helps

To Lower Heart Attacks

世界杯与心脏病



Winning soccer's World Cup not only lifts a nation's spirits, it lowers the death rate from heart attacks, according to a report in a medical journal.

During the 1998 World Cup, when France defeated Brazil in the final, deaths from heart attacks in men and women dropped on the day of the match. The final was watched by 26 million French television viewers.

Instead of the average 33 deaths a day in the five days before the match, only 23 men died of a heart attack on the actual day of the match. There were also fewer deaths in women, but the decrease was not as significant. And the death rate after the final remains at a low level.

Dr Frederic Berthier, of Nice Teaching Hospital in southern France, is not sure why the death rate fell, but he suspected it might be due to reduced stress. "Decreased activities and/or euphoria after the final could result in less stress," he reported in the journal *Heart*.

Berthier believes the national euphoria of the victory, combined with a day off from work, also contributed to the fall in heart attack deaths a few days later on 14 July, which was Bastille Day*, a national holiday in France. ■

Bastille Day: 巴士底日, 1789年7月14日, 作为法国专制性象征的巴士底狱被攻陷。为了纪念这一日子, 后将该日定为法国国庆日。

据一本医学杂志报道, 在世界杯赛场上获胜不但可以振奋民族精神, 同时还可以降低心脏病的死亡率!

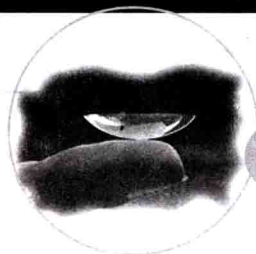
法国在1998年世界杯决赛中击败了巴西, 比赛当天(法国)死于心脏病的男女人数都有所降低。当时共有2,600万法国电视观众观看了这场比赛。

比赛前五天内, 平均每天死于心脏病的男性为33人, 而决赛当天仅有23人。女性的心脏病死亡率也有所下降, 但是下降的趋势不如男性明显。之后几天内, 心脏病的死亡率也保持在一个比较低的水平。

法国南部 Nice Teaching 医院的 Frederic Berthier 医生不能确定死亡率下降的原因, 他推测可能是由压力减轻所致。他在《心脏》杂志中报告说: “决赛后活动减少和心情愉快都可以减轻压力。”

Berthier 医生认为比赛胜利后举国欢庆的气氛和一天的假期也有助于几天后的7月14日心脏病死亡率的降低, 这一天恰逢 Bastille Day, 即法国国庆日。■

New Contact Lens May Measure Glucose



照镜子，测血糖

What if checking a person's blood sugar level were as easy as looking in the mirror?

The idea may become reality as researchers at the University of Pittsburgh work on a contact lens that measures glucose levels. They are trying to create a contact lens that will contain a chemical sensor at the edge of the lens which can be worn by everyone, even those who don't need vision correction.

For years, the medical community has been trying to find painless ways for diabetes patients to monitor their blood sugar levels. With an estimated 17 million Americans suffering from the disease, millions must endure painful finger testing by pricking themselves several times daily. Doctors often complain that even the most diligent patients don't test themselves enough.

The research team has already developed the sensor material for the lens, which would change color depending on the person's blood sugar level. Usually, green is for normal, red for extremely low glucose and violet for extremely high glucose. The next step is to embed the sensor into contact lenses. Patients will be able to determine their glucose levels by looking in a mirror and comparing the color to a chart.

The researchers said, it could be at least three years away from being available on the market. ■

如果检测血糖的高低就像照镜子那样简单将会怎样呢？

匹兹堡大学的科研人员正在研制一种可以测量血糖水平的隐形眼镜，如果研制成功，这个想法可能就会成为现实。研究人员试图制造出一种镜片边缘含有化学传感器的隐形眼镜，任何人都可以佩戴这种眼镜，即使是那些不需要矫正视力的人。

多年来，医学界一直在为糖尿病患者寻找无痛检测血糖水平的方法。美国有1,700万糖尿病患者，其中有上百万人每天不得不忍痛在自己的手指上刺上几针（以检测自己的血糖水平）。医生们也常说即使是再有毅力的病人也难以坚持下来。

目前研究人员已经研制了一种专门用于隐形眼镜的传感器，这样隐形眼镜就会随佩戴者的血糖水平而改变自身的颜色。一般来说，绿色表示正常，红色表示低血糖，而紫色代表血糖水平过高了。下一步，研究人员要将传感器安置在隐形眼镜里。病人只要照照镜子，同比色卡对比一下眼镜的颜色，就能够了解自己的血糖水平了。

研究人员称，这种隐形眼镜至少还需要3年的时间才能上市。■

Robot for Life on Mars



机器人的模拟实验

Scientists on the prowl for life on Mars are busy with their tests on the parched Atacama Desert of northern Chile. Scientists believe that if their high-tech robotics succeed in their quest to find life in the Earth's most inhospitable deserts, they may also be able to find life on Mars.

David Wettergreen, a research scientist at Carnegie Mellon University's Robotics Institute, described the Atacama as "the most arid desert on Earth. It is what scientists call an end member ecosystem in that it has the lowest organic content of anywhere on Earth." Scientists consider the barren and rocky terrain to be analogous to the terrain on Mars.

Hyperion is a 2 meter wide and 2 meter long robot with a 3.5 meter square solar panel for a roof. Named for the Greek word meaning "he who follows the sun," Hyperion is an auto robot. It is programmed to operate independently and can determine when to point its solar panel towards the sun.

In the Atacama Desert, researchers tested Hyperion's ability to navigate terrain similar to that on Mars. The researchers will focus on measurements and experiments with the robot's hardware and software components, including its ability to catch the signs of life.

Researchers will develop later generations of the robot for testing in 2004 and 2005, based on this year's desert trials. ■

智利北部炎热的阿塔卡马沙漠里，一些希望在火星上找到生命的科学家们正在紧张地进行实验。科学家们相信如果高科技机器人能够成功地在地球上最不适合居住的沙漠里找到生命的足迹，那么它或许也能在火星上找到生命。

卡内基梅隆大学机械人学院的 David Wattergreen 将阿塔卡马沙漠描述为“地球上最干旱的沙漠，科学家们称之为‘生态系统的极限’。在这样的环境中，只有地球上最低等的有机生物可以生存”。科学家们认为这样一个贫瘠和岩石林立的地形环境同火星十分相似。

“亥伯龙神”是一个 2 米宽，2 米高的机器人，它的顶部有一个 3.5 平方米大小的太阳能板。它的名字来自希腊语，意思是“追随太阳的人”。“亥伯龙神”是一个自动的机器人，它的预制程序可以使它完全独立地工作，并决定何时将太阳能板朝向太阳（以获取能量）。

在阿塔卡马沙漠里，研究人员检测了“亥伯龙神”探测类似火星表面的地形环境的能力。研究人员将重点测试和调试机器人的硬件和软件，同时检验它捕捉生命迹象的能力。

研究人员计划在今年沙漠实验的基础上于 2004 年或 2005 年研发改进型的机器人。■

今日视野，明日科学 II

■ 水青 选译

“什么是目前最迫切需要解决的科学问题？”2002年底，Edge.org网站的出版商John Brockman向全世界的知名科学家、作家和未来学家提出了这个问题。在不足两个月的时间，全世界有600多位科学家予以响应。下面我们摘录了一些有代表性的观点和看法，虽然各自的观点不同，但期望科学发展的意愿是一致的。

Seth Lloyd,
Professor of quantum-mechanical engineering at the
Massachusetts Institute of Technology.

塞思·劳埃德

麻省理工学院量子力学工程学教授



Science Without Secrets

没有秘密的科学

My advice is to keep science public. Secret knowledge, no matter how laboriously acquired, is less than science.

Some knowledge, of course, must remain secret for the security of the nation. But unless there is a clear security risk, publish all else. Why? Science belongs to the people: they pay for it; they benefit from it. The benefits of scientific knowledge accrue far more rapidly when that knowledge lies open for all to see, to test and to try.

In my field, quantum computation, openness is beneficial. Quantum mechanics is famously weird, and one of the consequences of quantum weirdness is that even a small quantum computer, consisting of a few thousand atoms, has the potential to break all existing public-key cryptosystems.

Thus, quantum computers pose a significant threat to the security not only of classified encoded material, but also of most commercial transactions. Yet our national security agencies have elected to award grant money for quantum computing research with the stipulation that the results be published.

This is a wise policy. There is no doubt large-scale

我认为应该让大众了解科学。无论需要多么深入的研究，秘密的知识都算不上是科学。

当然，出于国家安全考虑，必须对有些知识进行保密。但是，除了那些对安全构成真正威胁的部分，其余的应该全部公开。为什么？因为科学属于人民：他们纳税为科学研究提供了资金；也应该从中受益。只有科学知识向所有人公开，接受验证时，科学知识所创造的利益才会更加迅速地积累起来。

在我的量子计算研究领域里，研究成果公开化十分有益。众所周知，量子力学十分奇特。其中一个最不可思议的事是，即使是一台由几千个原子组成的小型量子计算机也有可能破解所有现存的“公共钥匙”密码系统。

因此，量子计算机不仅对分类的加密资料造成严重的威胁，还可能威胁到大部分的商业交易。虽然如此，我们的国家安全部门还是选择给量子计算研究计划大笔拨款，但条件是要将研究结果公之于众。

这是一个明智的政策。毫无疑问