contents

Shrunken Solar Power

A new solar cell is so small, it can sit on a soap bubble without bursting it.

Jennifer Abbasi

Scientists have created a solar cell so thin and light, it can balance on top of a soap bubble without popping it. A team of researchers at the Massachusetts Institute of Technology created the teensy device as a proof of concept. They wanted to make sure their new tiny design could still do the job of a solar cell—converting sunlight into electricity.

A scientist places a new solar cell on a soap bubble to demonstrate just how thin and light it is.

Making Solar Cells

Solar cells (also called photovoltaic cells) make up the solar panels you might find on rooftops. They work to provide an eco-friendly form of energy to power homes and buildings. Traditional solar cells are composed of the element silicon (Si) encased in glass. Silicone is a type of semiconductor—a material that doesn't allow electricity to flow through it as well as a metal does. This property allows it to absorb the sun's energy and build up an electrical charge.

For the new solar cell, the scientists coated a layer of plastic with a light-absorbing organic compound—a substance made up of the elements carbon (C), hydrogen (H), oxygen (O), and nitrogen (N). Then they placed another layer of plastic on top. Rather than being produced separately and then put together, the scientists vaporized (turned into a gas) the materials that make up the solar cell's components inside an airless vacuum chamber. The substances then settled and hardened on a carrier material to form the layers of the cell.

"We put our carrier in a vacuum system, then we deposit everything else on top of it and then peel the whole thing off," Annie Wang, an electrical engineer who worked on the project, recently told MIT News.

Small But Mighty

The scientists' innovative process results in solar cells with a thickness of about 2 micrometers (1 micrometer equals 1 one-millionth of a meter). That's one fiftieth the thickness of a human hair and one thousandth the thickness of a typical solar cell.

Not only are the solar cells lightweight and flexible, the new method used to make them also cuts back on contaminants, like dust, that can reduce their performance. And the new cells provide a lot of energy for their weight. In fact, they have among the best power-to-weight ratios ever achieved—about 400 times higher than silicon solar cells.

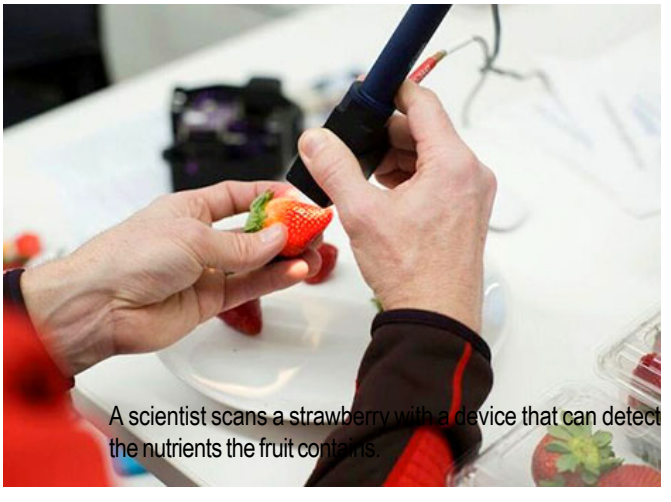
The solar cells are so light, that the scientists think they could be placed on research balloons that soar to high altitudes in Earth's atmosphere. The solar cells could even help power the next generation of ultralight portable gadgets.

Scannable Fruit

A produce scanner could change how we decide what to purchase at the grocery store.

Sara Goudarzi

As the saying goes, "An apple a day keeps the doctor away." That's because this healthy food choice is supposed to be chock-full of nutritional goodness. The apple you grab at the supermarket, though, might be so old that it has lost many of its vitamins and minerals.



A scientist scans a strawberry with a device that can detect the nutrients the fruit contains.

But soon there might be a way to check the quality of fruit by scanning it.

Scientists at Food + Future coLAB came up with the idea of a handheld spectrometer that scans food. The device will work by shining infrared light—an invisible form of energy waves—on a piece of produce. By measuring how chemicals in the fruit or vegetable absorb the light, the scanner can identify the food's chemical makeup.

"The machine could tell you exactly how old an apple is, how many calories it contains, what nutrients are present inside it, and even subtle nuances in taste," Greg Shewmaker of Food + Future coLAB recently told Fast Company magazine.

Good Apple, Bad Apple

For the new device to be useful to consumers, researchers first need to create a database that contains a range of possible chemical compositions for a particular type of fruit, like an apple, for example. Scientists will need to scan lots of pieces of produce to gather this data. Luckily, Food + Future coLAB has access to hundreds of thousands of apples thanks to its collaboration with the retailer Target. The information collected will allow the scanners to tell customers exactly where an apple falls on a nutritional scale.

Food in the Future

Once consumers know what's inside an apple, they can decide if they want to purchase it. Knowing fruit quality could also affect how a store prices items. "We could price produce based on the nutritional weight of the item and offer a discount for produce with lower nutritional value," Shewmaker recently explain to Smithsonian.com.

Food + Future coLAB has already created a working prototype, or model, of its device. It says you could see one in your local supermarket within the next few years. Then deciding whether you've picked the healthiest snack option will be just a quick scan away.

How Do Phase Converters Work?

Do you know how factories and homes in isolated areas get supplied with high electric power at a lesser cost? This is due to a device called phase converter, which converts power from a single-phase source into a three-phase power. This Buzzle post tells you all about the functioning of this device.

Tagged Under: Physics Electricity

Working of a phase converter

FYI

American Rotary is a world-famous Wisconsin-based company, which manufactures outstanding phase converters since 1991.

Phase converters were invented in the later part of the 1900s. This machine converts power from a single-phase source to three-phase power. There are scenarios wherein applications need three-phase power; however, only a single-phase source exists. These converters are used in such cases to convert the power obtained from a single source into a multiple source so that the applications can run smoothly nevertheless.

Basic Working Mechanism

Basically, a single-phase power source, say an AC motor, uses the principle of magnetism to alternate between poles. This produces varying voltages. Phase converters generate one-third voltage, which is added to the voltages present in the single-phase source. In other words, a third line of electric power is generated, which is combined with the two single-phase lines in order to produce a true three-phase power. Though this is the underlying phenomenon, it is achieved in various ways through different types of converters.

The Types

Static phase converters

This type is one of the simplest forms of phase converters. It uses a capacitor (Cs) and a voltage sensitive relay.

Static phase converter

L1, L2 = Single-phase source voltages

L3 = Third voltage source produced by the converter

Cs = Start Capacitor

Cr = Run Capacitor

Working

? The capacitor shifts the phase by creating a magnetic field that is equal to a three-phase source.

? After the motor gets started, the relay disconnects the capacitor.

? After this, the motor continues to turn on the single power supply only.

? Thus, the static type only produces a third phase current, which supplements the currents from a single-phase power source.

? Motors that are run using these converters can produce only about 50% of their estimated power.

? To increase the power slightly, a low cost run capacitor can be used. This will increase the production of power by a further 20% or so.

? As shown in the diagram, the start capacitor is used to start the motor, and then it is completely switched off.

? The run capacitor is always present, and it is carefully adjusted to balance the voltages at one load. The balancing of the voltage at the other load is almost nil.

? Thus, a third current line is maintained, even though the start capacitor is switched off as soon as the motor starts. This is because the run capacitor is designed to maintain some voltage.

? These converters have poor efficiency, as they end up delivering only half output, or they become damaged due to overheating. Consequently, they cannot be used for a long-term duration.

Rotary phase converters

This electromechanical device basically works like a rotating transformer.

Rotary phase converter

L1, L2 = Single-phase Source Voltages

T1, T2, T3 = Three-phase Output Voltages

Note: T1 and T2 should always be utilized to operate magnetic controls

Working

? It uses an independent three-phase motor and a group of capacitors (they function as one large capacitor). Thus, adding an idler to the static converter will give us a rotary device.

? The motor has three leads, and the single-phase source is attached to two of them.

? The third lead is attached to one of the source outputs. It is connected in series with the capacitors.

? When energized, the converter uses the two currents from the single phase from the utility and creates a manufactured third line of power.

? This voltage is produced by the rotating magnetic flux in the motor. It is shifted by 120° from the voltage between the first two terminals.

? The diagram shows source legs L1 and L2 as the input current sources. T1, T2, and T3 comprise the three-phase output voltages.

? If the converter is properly sized, these voltages will remain in a balanced state over the entire range of connected loads.

? For loads that need more balanced voltage in the output, the size of the frame of the converter motor is normally increased.

? These converters can provide resistive, capacitive, and inductive loads, and they can power several loads at one time. They have a simple design and are reliable and low on cost.

? However, the only problem is in maintaining a voltage balance. To combat

that problem, motors of a larger size are used only for a single machine each.

? Thus, these machines are an effective solution for simple load motors.

Digital Phase Converters

It is the most modern type of machine and is completely electronic.

Working

? It uses a rectifier, an inverter, and a digital signal processor (DSP) to produce a third voltage.

? The rectifier acts as the input module, while the inverter acts as the output module.

? The process is referred to as double IGBT (Insulated-gate Bipolar Transistor) conversion. The insulated-gate bipolar transistors work as the power switching devices here.

? The rectifier consists of IGBTs in series with the inductors. These converters normally operate at a frequency of 10,000 Hz.

? Here, the alternating current from the single-phase source is converted to direct current, and then back to alternating current.

? This incoming current is sinusoidal, and is drawn by the IGBTs. This is done with the help of DSP software.

? The IGBTs that comprise the inverter, create the AC voltage. This current is not sinusoidal, but it is a pulse-width modulated waveform.

? This voltage is passed through the inductor system to give a proper sine wave voltage.

? This voltage produced is added to the two voltages from the single source to create a true three-phase power.

? The DSP monitors the entire process at all times in order to create a perfect output.

Computer numerical control (CNC) machines are probably one of the most demanding applications for phase converters. These machines use electronics to control the speed and movement of multiple motors within the machine. However, they can be used only with rotary and digital converters.

Applications

These machines find their applications in places where there is only a single-phase power source for running various applications, which require three-phase power. Normally, a three-phase power is very costly, and it is often not supplied in all the areas. Therefore, these converters are quite useful for such applications.

? Building coolant pumps

Coolant pumps for hvac system

Coolant Pumps For HVAC System

? For CNC machines

Control panel of cnc machine

Control Panel Of CNC Machine

? Making air compressors

Air compressor on white background

Air Compressor

? Manufacturing HVAC (Heating, Ventilation, and Manufacturing Unit)

Hvac device

HVAC Device

? Powering rural areas

? Supplying electricity to small factories

? Running farm equipment

? Building efficient submersible pumps

? In woodworking shops

? Dual lift stations

? For welding equipment

? Elevator technology

? For electrical systems in combination with transformers

? Electric railways

Thus, phase converters are significant in order to produce multiple phase currents from a single source. They also cut down on the cost, as providing a complete three-phase power costs a lot for the utility company in terms of price and manpower.

Read more at Buzzle: http://www.buzzle.com/articles/how-do-phase-convertors-work.html

http://www.buzzle.com/articles/how-do-phase-convertors-work.html

Can a Penny Dropped From a Tall Building Kill You?

One of the more popular myths of recent times is that you can get killed by a penny dropped from the top of a tall building.

Tagged Under: Physics

Advertisement

A penny dropped from a tall building cannot kill you

Have you heard the one about the penny killing that guy under the Empire State Building? It's really skull-crackingly hilarious, isn't it?

It's a popular urban legend that a penny dropped from a tall building can not just cause grievous injuries, but can outright kill the unfortunate recipient of this ironic windfall. Many actually believe that the killer penny can not only kill people, but can seriously damage cars, and can cause cracks in the pavement.

A penny is the lightest coin in any denomination, but many people think that the height of skyscrapers or tall structures would enable the admittedly light penny to reach a fatal velocity. So, would making a wish and flinging a penny from the top of a skyscraper be the cause of tragedy for some innocent fellow standing below?

Luckily, the low weight and flat, circular shape of a penny means that it can't penetrate the skull of a healthy human being. Babies are at risk from such objects, since their skulls are much weaker and undeveloped for the first few months, but even babies are not at mortal risk. Having said that, it would be wise to not try that out on a trial-and-error basis.

Why is a penny safe?

Penny saved

A penny is a flat, circular, light object. Its flat surface results in a high amount of drag. As opposed to bullets or missiles, pennies aren't shaped for aerodynamic optimization. Due to the peculiar wind patterns occurring around tall structures, objects dropped from the top face severe updrafts. This causes them to slow down, until their gravitational acceleration equals the force of the updraft. This stage is known as terminal velocity;

Objects falling at terminal velocity no longer accelerate due to gravitation, but merely fall at their terminal velocity. If the upward forces of the wind exceed gravitational acceleration, the penny will be thrown up, but this only happens in very windy conditions.

Due to the penny's weight, it reaches terminal velocity fairly quickly?at a mere 25 mph. The terminal velocity of a penny is so low, in fact, that it would not be fatal even if it was dropped in vacuum, thus preventing the retardation caused by the updrafts. In vacuum, the terminal velocity of a penny would be approx. 208 mph. An impact at this speed would certainly cause severe injuries, but would probably not kill. For comparison, most bullets are shot at more than five times that speed. If you are unfortunate enough to be hit by the edge of a penny on weak areas of the face such as eyes and the nose (which is statistically impossible) in vacuum, the aftereffects of

the injuries may cause complications that lead to death. But, as previously mentioned, this is a statistical impossibility, and if you are in vacuum, falling pennies are the least of your worries!

Physicist Louis Bloomfield performed a series of experiments about this very urban legend. He even caught some pennies on his own face, and reported no pain. In his own words,

A penny is pretty much a little nothing. It's not a very compact object. It doesn't drill into you very well!

How did the legend arise?

Objects falling from a tall building are inherently dangerous. While a penny is too light to be sufficiently forceful, objects such as nuts and bolts, and keys can be dangerous. That is why hard hats are mandatory during construction.

Objects either heavier than a penny or having a sharp tip can indeed be fatal, given suitable wind conditions. A ball-point pen, for instance, could prove fatal if it managed to land on the tip. Since pens necessarily have a sharp tip, all the downward force of their fall is concentrated in the single point, instead of being distributed across a flat surface like with pennies. If the pen rolls and hits you on its side, it would be much less traumatic, but if it merely rotates and remains fairly stable, its accidentally aerodynamic shape would cause it to attain a much higher terminal velocity than pennies, and can deliver a deadly punch.

All things considered, it's fairly safe to walk by skyscrapers without worrying about tragic windfalls.

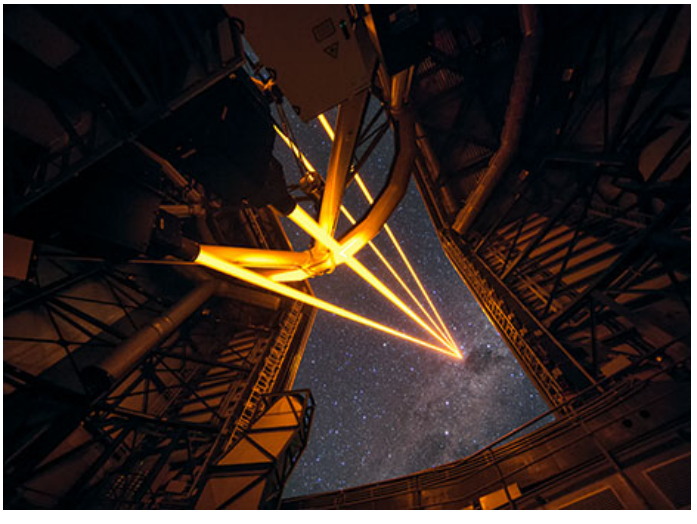
Read more at Buzzle: http://www.buzzle.com/articles/can-a-penny-dropped-from-a-tall-building-kill-you.html

Sky Lights

Powerful beams of light help astronomers get a clearer view of distant objects in space.

Sara Goudarzi

On April 26, a spectacular light show lit up the night skies above Chile's Atacama Desert. Astronomers fired four powerful lasers attached to the Paranal Observatory's Very Large Telescope. The concentrated beams of light made sodium atoms in our



atmosphere—a protective layer of gases surrounding a planet—glow so that they resembled stars. The fake stars, dubbed "guide stars," help the telescope create sharp images so astronomers can get a better look at the cosmos.

Blurry Vision

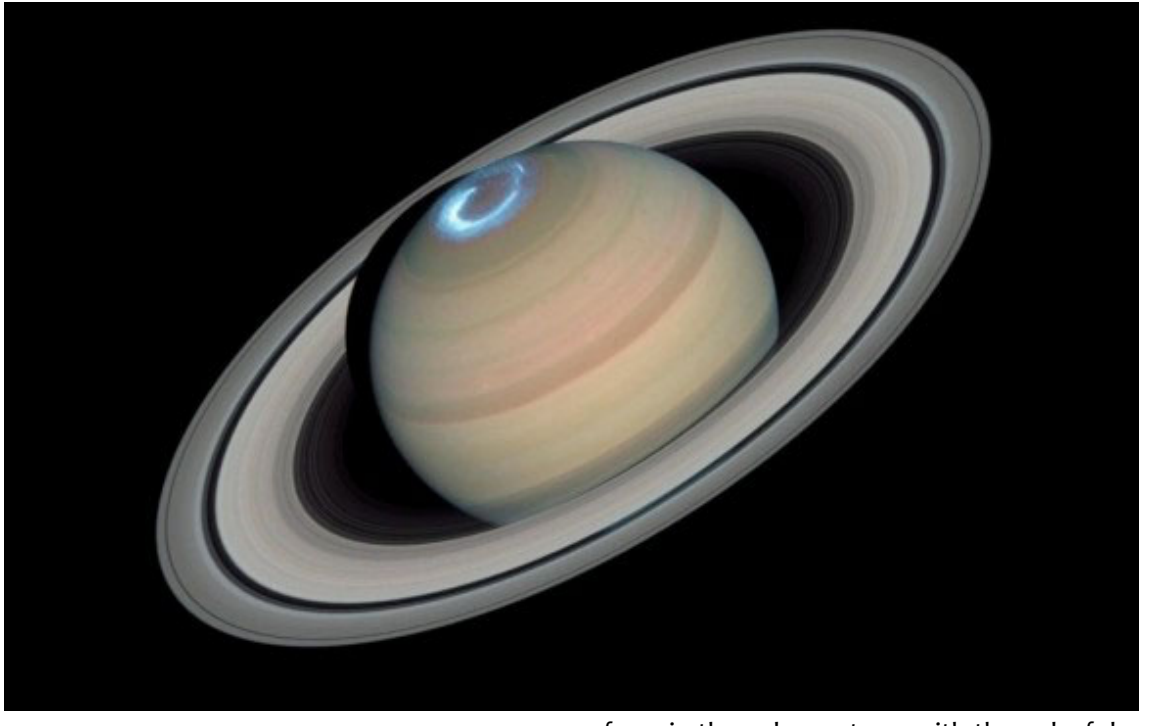
If you've ever observed stars at night, you've likely noticed that they twinkle. That's because the light from stars becomes distorted as it travels through the turbulent (moving irregularly) layers of air that make up Earth's atmosphere. This distortion makes stars viewed through telescopes on the ground appear blurry, so it's hard for astronomers to get a clear view.

To fix the problem, scientists have launched telescopes, like the Hubble Space Telescope, into space. They orbit—or circle—Earth, beyond the disturbances caused by our planet's atmosphere. But scientists also came up with a way to observe stars without leaving Earth's surface using a technique called adaptive optics. It requires building ground-based telescopes designed to measure and correct light distortions. For that, guide stars are needed.

Guiding Glow

Astronomers can compare guide stars' known brightness to that of nearby stars to see how their light changes as it travels from space to Earth. A computer monitors these changes and sends the information to a telescope's mirrors. The mirrors, which focus light, adjust to cancel out atmospheric disturbances, giving astronomers sharper images of distant worlds.

The Very Large Telescope's new system creates the most powerful laser guide stars to date. Having four of these 30 centimeter (11.8 inch)-wide beams will allow astronomers to view a bigger chunk of the sky. "Using more than one laser allows the turbulence in the atmosphere to be mapped in far greater detail to significantly improve the image quality over a larger field of view," representatives from the European Southern Observatory, which operates the Very Large Telescope, recently stated in a press release.

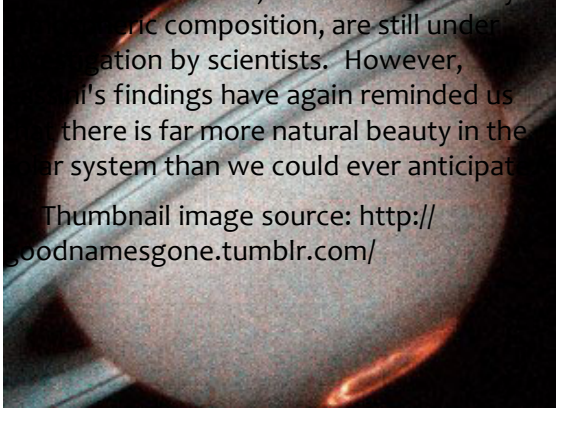


Saturn's Aurora

Posted by: Matt Elkins Tags: Cassini, Cassini-Huygens, NASA, Saturn, Saturn's aurora, solar system, Titan Posted date: December 30, 2009 | Comment

The many wonders of Earth are but a fraction of the grandeur of our solar system, yet many of Earth's marvels are not unique to the blue planet. One of Earth's more beautiful natural phenomena, an interaction between charged particles in the atmosphere and Earth's magnetic field known as the aurora, has also been observed at the poles of the gas giant Saturn. The National Aeronautics and Space Administration's (NASA) space probe Cassini, which has been studying Saturn and its moons since 2004, has recently recorded video footage of Saturn's aurora. The Cassini-Huygens project, a joint effort between NASA, the European Space Agency (ESA), and the Italian Space Agency (ASI), is also responsible for the previous discovery of water within the moon Enceladus. The project's analysis of Saturn's aurora has ranked it as the "tallest" of any in the solar system, with the colorful flares appearing over 750 miles from Saturn's northern hemisphere.

Aside from its beauty, Saturn's aurora can give scientists more information about the planet. Analysis of the changes within the light pattern could reveal certain characteristics about Saturn's magnetic field. These findings may allow scientists to better understand the gas giant. The height of the aurora also uncovers another fact about Saturn's atmosphere: that it is mostly hydrogen gas, which is far lighter than the nitrogen gas prevalent in Earth's atmosphere. Other aspects of the aurora such as its true color, which is affected by ic composition, are still under ation by scientists. However, 's findings have again reminded us there is far more natural beauty in the r system than we could ever anticipat



Thumbnail image source: http://oodnamesgone.tumblr.com/

A reptile specialist extracts venom from a deadly Eastern tiger snake to create antivenom—a lifesaving snakebite treatment.

Biting Back

Scientists turn to chemistry to develop new snakebite treatments.

Sara Goudarzi

A snake's bite can be deadly. If a victim receives antivenom—a medicine that counteracts the effects of a snake's venom—quickly enough, though, they might have a chance of survival. But around the world, antivenoms are in short supply. That's because the medicines require collecting venom from actual snakes, making them expensive and difficult to make. To solve the shortage, scientists are working to engineer artificial venom and antivenom molecules—two or more atoms bonded together.

Lifesaving Medicine

Each year, about 90,000 people around the globe die from snakebites. Many of those victims live in the developing world. The largest number of fatal bites occurs in Southeast Asia, India, Brazil, and Africa. In these poorer counties, antivenoms are expensive and not readily available.

Pharmaceutical companies have difficulty making large amounts of antivenom because it requires raising snakes in captivity. Each snake provides only a small amount of venom at a time. Also, companies must make many types of antivenom because each is effective against only one particular type of snake. Because manufacturing the medicines is hard and not that profitable, fewer and fewer companies are choosing to sell them.

That's why Paulo Lee Ho, a biochemist at Butantan Institute in São Paulo, Brazil, has been searching for better ways to create treatments for snakebites. "We need a new

way to meet the demand for antivenom," he recently told Nature magazine.

Making Antivenom

For more than a century, scientists have been making antivenom by first injecting a tiny, harmless dose of venom into a large animal, like a horse. This triggers the animal's body to produce antibodies. These specialized molecules attack and disable the venom's toxins. The antibodies are removed from the horse's blood and given to snakebite victims as antivenom.

Last month, Ho reported making artificial DNA—the molecule that carries hereditary information—that triggered the production of antibodies in mice against deadly coral snake venom. Other scientists recently engineered artificial pieces of antibodies that combatted the effects of pit viper bites.

Researchers hope these new methods could make treatments more accessible to snakebite victims and, as a result, save more lives.

"There has been significant, rapid progress in this area, but it needs to be fast," says Robert Harrison, the head of the Alistair Reid Venom Research Unit at the Liverpool School of Tropical Medicine in England. "There are too many people dying from what is essentially a preventable disease."

Medicines that make you smarter

Mon, 10th Sep 2012

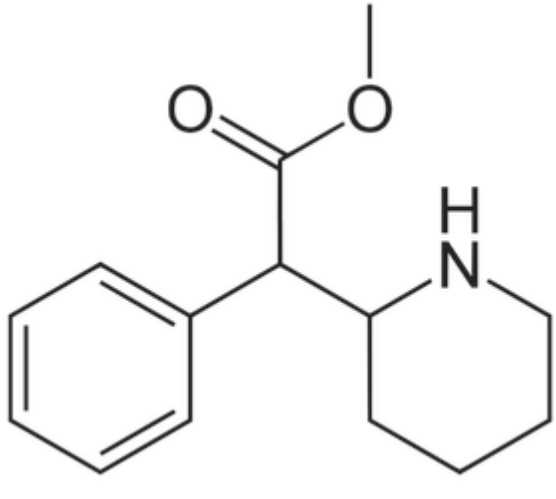
Is harder, stronger, faster really better?

Ginny Smith

Humans have always devised ways to overcome our shortcomings- we couldn't fly, so we invented aeroplanes; we couldn't breathe underwater, so we invented submarines and scuba-diving equipment; we couldn't analyse huge amounts of data in our heads, so we invented computers. This ability to devise machines to enable us to do things that would otherwise be impossible has allowed us to expand to fill almost every corner of the planet, and to perform feats of science, art and engineering that would be impossible for any other animal.

CoffeeAs well as creating machines to help us, we have always searched for ways to make ourselves more efficient, faster, stronger, and smarter. Millions of people rely on the caffeine in their morning cup of coffee to give them the kick to get out of bed, and sport is a minefield of legal and illegal drugs and techniques designed to help athletes to perform to the best of their abilities (or even better!). Now a new generation of drugs are being used expressly to enhance our mental capacity. These tablets can, quite literally, make you smarter.

Chemical structure of methylphenidateMost of these drugs were originally developed to treat various medical conditions, and have only recently begun to be used by the healthy population for a mental 'boost'. Ritalin, for example (the chemical name of which is methylphenidate), is a



stimulant related to amphetamine, and is prescribed mainly for the treatment of attention deficit hyperactivity disorder (ADHD). It is useful in these cases as it increases attention and helps prevent the easy distraction that is so common in the disorder. It does this by blocking reuptake of dopamine and noradrenaline in the brain, so increasing the availability of these neurotransmitters. For the same reasons, Ritalin has become a popular drug for students to take whilst studying for exams.

Other commonly used drugs include modafinil, which is intended to help those who suffer from narcolepsy by relieving their daytime sleepiness, and beta-blockers, which help reduce anxiety. A survey by Nature found that 20% of the 1400 respondents had used one of these 3 drugs for non-medical reasons. As well as students using it to help with studying, it is used by shift workers to keep them alert, and by travellers to avoid jet lag. It has been shown that it can be effective in relieving shift work sleep disorder, however there are worries that people may become too reliant on it, or start to believe they can go without sleep at all, which could be hugely damaging to the brain.

ModafinilAside from being interesting from a scientific standpoint, these drugs have raised some fascinating ethical dilemmas, and academics seem divided on the point. In one camp are those who think that it is always wrong to tamper with a healthy brain in order to improve it. They argue that these drugs were designed to help those with a disorder, and to use them to improve the abilities of a healthy person is immoral. The worry is that if some people in a social group, e.g. students, were taking the drug, it would become almost impossible for others to compete without also taking the drug. A parallel to this was seen in the 1970s and 80s, before mandatory drug testing was introduced in athletics, where steroid use became almost necessary in order to compete.

Widespread use of cognitive enhancers could lead to a situation in which young people were forced to medicate themselves in order to compete in academic situations. As well as putting added pressure on an already stressed and vulnerable group, the question of elitism is raised. These cognitive enhancers are not going to be available for healthy people on the NHS, and are unlikely to come cheaply. There is already an educational divide, with children whose parents can afford to send them to the best schools, or pay for extra-

curricular tutors, coming out with better results than those children who have not had this extra support. If only the rich could afford these drugs, that would give them another advantage, which seems unjust. It is possible that in 20 years' time, children will have to be tested for drugs before being allowed to sit an exam, much as athletes are today.

Another worry is the long term side effects of these drugs. Although they have not been shown to have any serious side effects during short term usage, they are relatively new compounds, so there is a lack of evidence about what chronic usage could do to the brain. This is particularly important due to the likelihood of the drugs being used by young people, whose brains are more vulnerable to disruption. Even in the case of Ritalin, which has been around for over 35 years as a treatment for ADHD, it is not clear what effect its chronic usage may have on the developing brain (partially as is it difficult to disentangle the effects of the drug from the effects of the disease itself). All medicines have side effects, but in most cases it is argued that their benefits, in correcting something that is wrong with the body or the mind, outweigh their disadvantages. In the case of using a drug to self-improve, rather than to medicate, however, it could be argued that the positives are not worth the risk of the negatives, in any circumstance.

However, there are also positives that could come out of the use of cognitive enhancers, and many academics do not believe they should be banned or controlled. A philosophical argument for this is based on J.S Mill's theory of Utilitarianism, which argues that adults should be allowed to do what they like, as long as it does not cause harm to those around them. Based on this argument, if a rational adult looks at the possible risks and unknowns surrounding taking a drug, and decides that its benefits make it worth taking, it is not the government or society's place to tell them they cannot do so, as long as they are not harming anyone else. A less theoretical argument looks at the possible benefits to society that could come from people taking these drugs - if a cure could be found for cancer by giving researchers cognitive enhancing drugs, conceivably that benefit would outweigh any negatives that may occur by making the drugs available.

Surgeons at workCognitive enhancers could also be helpful in many high pressure jobs. Surgeons often have to concentrate for very long periods of time when performing tricky operations, and many rely on caffeine to help them with this. Large amounts of caffeine, however, can cause side effects such as tremors, which are less than ideal when performing delicate operations. Drugs such as modafinil have been shown not to produce such side effects, and so could be used to keep surgeons alert and focused on a difficult operation. They could also be useful for pilots, whether fighter or commercial, and in any other jobs or situations where a momentary lapse in concentration could be catastrophic.

These drugs could have major benefits for our society, but the negatives of their long term use are unknown. The debate over how, or whether, to control these substances has high profile supporters on both sides, and it is unlikely the issue will be resolved any time soon. What is clear is that the field of neuroethics is growing in importance, and it is likely that as brain science progresses the need for discussions of the philosophical, medical and even political aspects of cognitive enhancement will only increase.

Grauer's gorillas, like this one, are the largest of the four types of gorillas.

Big Trouble for a Great Ape

The population of Grauer's gorillas has been falling fast, putting these creatures in danger of extinction

JENNIFER MARINO WALTERS

Scientists are concerned that a great ape, called Grauer's gorilla, may soon become extinct. Standing more than 1.5 meter (5 feet) tall and weighing about 180 kilograms (400 pounds), the Grauer's gorilla is the world's largest primate—the category of mammals that includes humans, apes, and monkeys. According to a recent report, the number of Grauer's gorillas has dropped from about 17,000 in 1995 to only about 3,800 today. That's a decrease of about 77 percent.

"The amount of the decline was a shock—much worse than we had predicted," says Andrew Plumptre, a scientist at the Wildlife Conservation Society (WCS) who helped author the report. If the decline continues at the same rate, he and other conservationists fear that Grauer's gorillas could disappear from the wild forever in the next 5 to 10 years.

GORILLAS IN DANGER

Grauer's gorillas—also known as eastern lowland gorillas—live only in the forests of eastern Democratic Republic of the Congo, a country in Africa. In recent years, the animals have lost much of their forest habitat—an organism's natural home—as

people have cleared trees to make room for farms and livestock. The gorillas faced other serious threats as well.

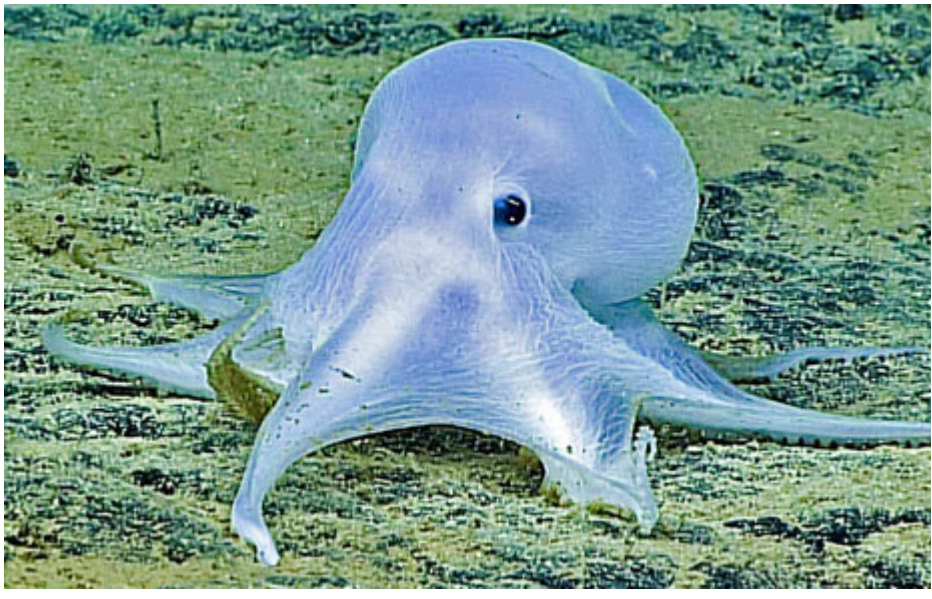
From 1996 until 2003, a civil war raged in the Democratic Republic of the Congo. The war killed 5 million people and had devastating consequences for wildlife, especially Grauer's gorillas. To help fund the fighting, armed groups set up mines to unearth copper and other resources in remote areas. With little food available, the miners began to poach—illegally hunt—and eat local wildlife. Grauer's gorillas were prized targets because of their large size. Though the fighting has mostly stopped, nearly 70 armed groups remain in the country. Mining operations continue to grow, and many Grauer's gorillas are still killed for their meat.

HELP ON THE WAY

Since the 1980s, Grauer's gorilla has been listed as endangered—having a high risk of extinction in the wild. Conservationists are now pushing for the animal's status to be changed to "critically endangered"—only one step away from being labeled as extinct. This change would bring more support and funding to help save Grauer's gorilla.

Some people are already working to help the species make a comeback. Officials at Kahuzi-Biega National Park in the Democratic Republic of the Congo have increased efforts to protect gorillas inside the park. As a result, the number of Grauer's gorillas there has risen from 132 in the year 2000 to 200 today. The WCS is also working to create two new protected areas that would safeguard 60 percent of the gorillas' remaining habitat. Many experts hope that the government will take steps to help the gorillas, too, like ending illegal mining.

"There is still hope to save these animals and the ecosystems they represent," says Jefferson Hall, a scientist at the Smithsonian Tropical Research Institute who worked on the recent report.



This rare octopod, a cousin to the common octopus, was caught on video for the first time a few months ago.

Ghostly New Creature

Scientists discover a new species of octopod in the deep sea near Hawaii.

AMY BARTH | for

In February, scientists exploring the Pacific Ocean near Hawaii made an amazing discovery. They had sent a remotely operated vehicle thousands of feet below the waves to take video of the deep sea. Dozens of team members were watching the live video feed from a ship on the ocean's surface and from offices on land. Suddenly, a mysterious creature appeared on their screens. It was a white, ghostlike octopod. That's a category of eight-armed ocean animals that includes the common octopus. But it didn't look like any octopod the scientists had seen before.

"I was really excited because I recognized it was something unusual," says Michael Vecchione, a zoologist (a scientist who studies animals) at the National Oceanic and Atmospheric Administration. Vecchione and other scientists spotted the octopod while working on a project to map the ocean floor near Hawaii and study the ocean life there. The creature was an exciting—and unexpected—find.

A UNIQUE SPECIES

The newly discovered octopod has tiny eyes and a jelly-like body. It has very few muscles. That's because there is little food in the deep sea, and a lot of food is needed to build muscle. The creature also has some unusual characteristics that set it apart from other octopods.

"The first thing that makes it really unusual is that it doesn't have any chromatophores, or pigment cells," says Vecchione. Pigment is what gives animals color. Because this creature has no pigment, it's very pale. It also has fewer rows of suckers on its arms than other

octopods do. Octopods use these suckers to grasp objects. Those two characteristics lead scientists to believe that it's a completely new octopod species.

The creature is also a record setter. It was spotted at about 4,300 meters (14,000 feet) beneath the waves. Some other types of octopods are known to live that deep in the ocean, but they all have fins on the sides of their bodies. The new creature belongs to a category of octopods that don't have fins. Until this discovery, no finless octopod had been found below about 4,000 m (13,000 ft).

MORE TO DISCOVER

Because of the octopod's ghostlike appearance, it has been given the nickname Casper. (Casper the Friendly Ghost was a popular character in an old cartoon.) But it cannot be officially named until scientists get a specimen of it to examine more closely. Unfortunately, that's not likely to happen anytime soon.

"The likelihood of encountering another one of these octopods is very small," says Vecchione. "So it wouldn't be a very productive use of our time and resources to try to look for one."

Still, the octopod's discovery is exciting because it suggests that many more undiscovered species could live in the deep sea and other places on Earth. "It illustrates how little we know about life on our planet—and how much more we can find," says Vecchione.

Mushroom Magic

How psilocybin, the active agent in magic mushrooms, is opening a window into human consciousness...

Philip Strange

The story begins on the morning of October 3rd 1799. A poor man can be seen in the gloomy dawn light gathering field mushrooms in London's Green Park. When he gets home, the mushrooms are cooked with flour, water and salt to provide a Psilocybe semilanceatamorning broth for him, his wife and their four children.

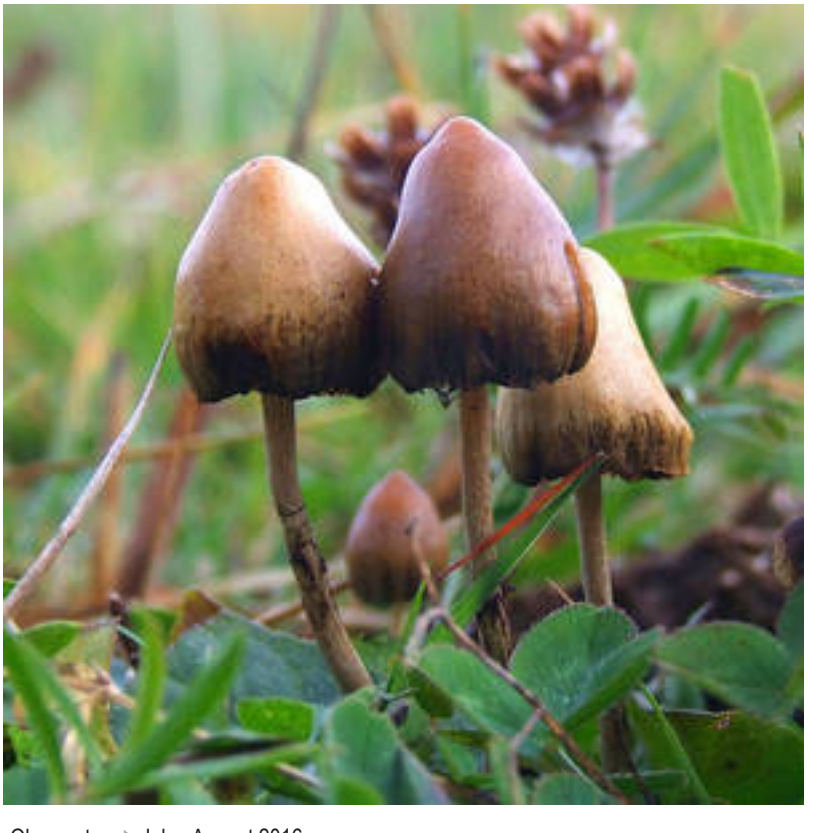
A few hours later Everard Brande, a doctor, is summoned to the household where the family are experiencing strange symptoms. The father has developed vertigo and disturbed vision; the rest of the family complain of poisoning and stomach cramps with their extremities becoming cold. Their pulses and breathing oscillate between frightening highs and lows. The family are overwhelmed with the fear of dying – all, that is, except eight year old Edward, who is "attacked with fits of immoderate laughter".

Nowadays we can be fairly certain that the strange symptoms experienced by the family 200 years ago were the result of accidental consumption of Liberty Cap mushrooms. Or, to give them the name by which they are better know, "magic mushrooms" or "shrooms".

These grow widely in the UK and continental Europe in the autumn. They carry the name "Liberty Cap" because of their resemblance to the Phrygian Cap, commonly seen as a symbol of liberty.

Magic mushrooms

Liberty Cap mushrooms (Psilocybe semilanceata) are part of the large family of up to 200 species of Basidiomycota mushroom that contain the psychedelic drug psilocybin. These mushrooms are found in many parts of the world, with the Psilocybe genus being the major type. Psilocybe have long been associated with ritual because of



Various Mushroom Stones (approx 1 ft tall - 1000 B.C. to 500 A.D.)

their ability to change human perception – the "psychedelic" effect. Evidence has been found in Algeria, Mexico and Spain for their use in religious ceremonies. The Aztecs called them teonanacatl (divine mushroom) and the mushrooms were reportedly served at the coronation of Moctezuma II in 1502. Use of Psilocybe by the Aztecs was suppressed following the Spanish conquest, but they continued to be used covertly by native Indians in this part of America.

Little was known about these ceremonies in the US and Europe until husband and wife team Gordon and Valentina Wasson travelled to Mushroom statuesMexico in the 1950s. Their aim was to understand the culture associated with the "divine mushroom" and they made several visits to Mexico at that time. In 1955, Gordon Wasson was one of the first westerners to participate in an indigenous mushroom ceremony. Wasson wrote an article for the popular magazine "Life" in 1957, describing the mushroom ceremony and the sensations he experienced. The French mycologist, Roger Heim, accompanied the Wassons on one visit and Heim identified the mushrooms as Psilocybe mexicana.

The next step was to identify the active chemical in the mushrooms, so samples were given to Albert Hofmann at Sandoz in Basel. Hofmann was already well known as the chemist who had first synthesised the related psychedelic drug LSD in 1938, and who later inadvertently experienced the effects of the drug himself. Hofmann made extracts of the Psilocybe and analysed the constituents for their psychological effects, often testing the extracts on himself. He showed that there were two principal active compounds in the mushrooms, psilocybin and psilocin; once ingested, psilocybin is rapidly converted to psilocin.

The effects of psilocybin and LSD

So what are the effects of psilocybin and psilocin on humans? Psilocybin has effects rather similar to the two other principal psychedelic drugs, mescaline and LSD, although there are differences in detail and in potency. Sol Snyder, in his book Drugs and the Brain, describes how he took LSD to document and understand its effects. This is an excellent description from a respected scientist; he reports changes in sensory perception, especially visual effects. Objects

may seem distorted, change colour or even move. Confusion between sensory modalities (synaesthesia) may also occur. Sense of time and space are altered but it is the effect on the sense of self that is particularly striking. "Boundaries between self and non-self evaporate, giving rise to a serene sense of being at one with the universe." He goes on to speculate: "The almost predictable transcendence of ego boundaries brought on by these drugs has caused scientists to consider that there might be a neural basis for the ego." Others report heightened awareness, super-reality and mystical experiences after taking the drug. Many people have enjoyed the effects produced by these drugs, which sometimes offer insights not available in normal life. For others it is an unpleasant experience and a minority have injured or killed themselves as a result of disorientation caused by changed perception or loss of self. The experience may depend on the state of the individual and their environment when they take the drug ("set and setting"). More recently a five-component scale has been devised to provide a semi-quantitative measure of the effects of these drugs.

Mechanisms of action of psilocybin and LSD

So, how are these curious effects on human consciousness achieved by these drugs? In the case of psilocybin and LSD, it is thought that the drugs hijack some of the normal processes in the brain. Brain function depends on the release of chemicals termed neurotransmitters. These are detected by their binding to specialised proteins called receptors. One neurotransmitter that is important for regulating a host of functions in the brain and elsewhere is serotonin. This neurotransmitter regulates behaviour, mood, sleep, appetite and blood flow. Psilocybin and LSD both bind to and activate receptors for serotonin that are present throughout the nervous system, so it is not surprising that they have such broad impacts on beaviour and function.

To probe these effects more deeply, scientists have begun brain scanning individuals using the agent, but so far the results are unclear. One study found brain activation Ruby Slipperswhen psilocybin was administered to human volunteers, whereas another study reported reduced activity, so further work is required.

Therapeutic use of psilocybin

In the 1950s it was felt that drugs such as LSD and psilocybin held promise as therapeutic agents and they were used during psychotherapy to lower psychological defences and to facilitate emotional insight. In the 1960s the effects of psilocybin were studied by the Harvard Professor Timothy Leary, who became notorious for his work on psychedelics. Leary's eventual dismissal from Harvard fuelled the growing view at the time that use of these drugs was a form of cultural rebellion. The drugs were increasingly discussed by the media in terms of their potential for abuse and there were moves by the authorities to ban the drugs. Now, LSD, psilocybin and mescaline are controlled drugs in most countries. Somewhat anomalously, the Psilocybe mushrooms were not initially controlled and even in the early years of the 21st century there were shops freely selling "shrooms" in London. In 2005 the law in the UK was changed and the mushrooms were included in the ban, but as with other controlled drugs nowadays, it is still possible to buy the mushrooms via internet suppliers.

When the drugs became illegal this

inhibited research on their therapeutic uses almost completely. Recently there has been a resurgence of interest and several careful studies have been performed on the effects of psilocybin on humans.

Franz Vollenweider and colleagues in Zurich have carefully examined the effects of psilocybin on humans, cataloguing the psychological effects using standard rating scales. Based on their observations, they concluded that, although there is a small risk of a bad reaction to psilocybin, which could include dysphoria, anxiety or panic, the administration of moderate doses of the drug to healthy, high-functioning and well-prepared subjects is associated with acceptable levels of risk providing it is done in a carefully monitored research environment. They did state, however, that this did not apply to recreational or less-controlled studies.

Roland Griffiths and colleagues at Johns Hopkins in the US have also examined the effects of psilocybin with a focus on spirituality. They administered psilocybin under controlled conditions to a group of human volunteers who regularly participated in religious or spiritual ceremonies. The acute perceptual and subjective effects of the drug included a complete mystical experience for 61% of those tested and/or extreme fear and anxiety in 39% of those tested. One month after testing, about two thirds of the participants rated the experience as having substantial personal and spiritual significance leading to positive change in attitude, mood and behaviour. 14 months later, these feelings were undiminished. These are fascinating observations, suggesting that psilocybin has considerable potential for changing human behaviour.

Psilocybin has also been reported to have useful effects in treating obsessive-compulsive disorder, cluster headache and anxiety associated with terminal cancer.

The future for research on psychedelics?

After a hiatus of 40 years, research on psychedelics has begun again, albeit slowly. Drugs such as psilocybin hold great promise as therapeutic agents and as tools for understanding human consciousness, providing they are used under controlled conditions. It is difficult to avoid the conclusion that by banning psilocybin we may have missed out on many useful effects of this drug.

How we sense temperature

What you Need

3 water tight containers, each with a capacity of between 2-5 litres, and big enough for somebody to submerge their hand in

2. A couple of cupfuls of ice

3. 1-2 litres of cold tap water

4. 2-5 litres of hot water (bath temperature, about 400C)

5. 2-5 litres of tepid water (cold water with a dash of warm added in, about 220C)

6. You, with your sleeves rolled up.

What to do

Set up your containers:

Add ice plus cold water to the left hand side container

Add room temperature water to the middle container

Add bath temperature water to the right hand side container

Jugs water

Plunge your left hand into the container holding the ice, and your right hand into the container holding the bath temperature water. Make sure the water goes up to at least the base of the fingers –up to the 1st knuckles, also called the major knuckles. Leave your hands in the water for about 2 minutes.

hands in container

Then simultaneously move both of your hands into the middle container.

Kate surprise illusion

What do you feel?

What may happen

You will probably be experiencing something quite peculiar – a mismatch, or difference in temperature sensation, between the two hands. Even though both hands are now in the same container, and experiencing the same temperature, the left hand should feel hot, whilst the right hand should find the water pretty chilly.

Why does it happen?

Which part of the brain is responsible?

The somatosensory cortex. This brain region is band of tissue running along the top of your brain, from the back of one ear to your other ear and processes all of the sensory information. The somatosensory cortex is about the same place as where headphones go over your head, see Kate demonstrating this here: Kate surprise

illusion

Why is this happening?

You are experiencing something called a sensory adaptation – a phenomena that hands are particularly prone to.

Our hands, especially our fingertips, are well evolved to help us collect information to help explore the world around us, providing us with information about temperature, texture and shape. Human fingertips contain some of the densest areas of nerve endings on the body - there's about 25, 000 nerve receptors per square cm! It is this abundance of nerve endings that allow them to collect information to such a fine degree and send signals to the brain to process this information.

Fingers

Your hands, and fingertips, are key components of the so called somatosensory system which provide us with our physical sensation of the world. This also includes our skin, muscles, the heart, joints, bones and heart.

Sensation detecting nerves found in this system are called sensory nerves and are activated by different sensations, be it temperature, pain, or tactile sense (touch). On the end of each sensory nerve there are many different receptors which detect different feelings. For example, thermoreceptors specifically detect temperature. Some thermoreceptors detect cold conditions whilst other thermoreceptors are activated by warmth.

In this experiment when the left hand is placed in ice cold water the cold sensitive thermoreceptors are activated causing an electrical pulse which passes down the sensory nerve in the fingertips and hands to the brain.

On the other side, when the right hand is placed in the bath warm water is having its heat thermoreceptors activated, causing a different type of electrical pulse to propagate down the warm sensory nerve in the fingertips and hands to the brain.

Electrical information from the thermoreceptor activation is passed from

your hands, along your arms, up through the top part of your spinal cord and into the brain through the sensory nerves. The information is then processed in the region of the brain called the somatosensory cortex, see above.

If your hand is exposed to heat for a long time then the hot sensitive receptors, will, much like muscles after a long workout, start to get tired. They become less sensitive to the stimulus and dampen down their activity and decrease the electrical signal which is sent to the somatosensory area of your brain.

The same things happen to the cold receptors; if your hand is exposed to the cold for a long time then the nerve endings become less sensitive to cold.

You desensitised your cold nerve endings on your left hand by exposing them to ice cold water. When you then moved their hand to a warmer environment the cold sensitive receptors had adapted and dampened down their activity, but the warm receptors had not, and comparatively had high potential levels of activity meaning your left hand perceived the middle container to be warmer than it really was.

On the right side, you effectively wore out your hot sensitive nerve endings by exposing them to warm water. When you moved your hand to a colder environment the hot sensitive receptors had adapted and dampened down their activity, but the cold receptors had not, so the right hand perceived the middle container to be colder than it really was.

This process of adaptation of the thermoreceptors and sensory nerves explains why you experienced such a mismatch of temperature sensation when your hands were in the middle container. Sensitivity to temperature had altered based on your previous environment.

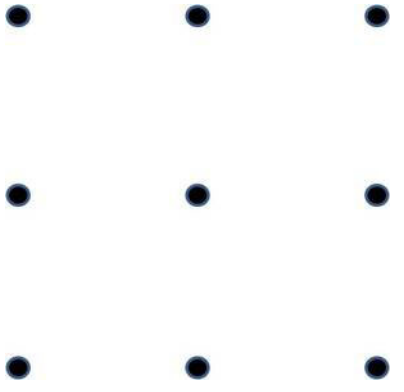
The same process explains why when you first jump into the sea on a really warm day Diving, free stylethe sea feels rather chilly at first, but then you don't notice the temperature so much. But if you jump into the sea on a colder day the sea doesn't seem to be that nippy. It's all relative!

Similarly when you first rest your hand on a table you notice the texture and temperature of the table but after a while you don't feel it. Take your hand away for a while and then put it back and you will start to notice the sense of the table again. This is also due to sensory adaptation.

Why do scientists study this?

There's lots of research being done on temperature sensation. Scientists study earthworms, zebra fish and fruit flies to understand it! Why? Well it helps to give us a better handle on how our nervous system takes in information about the world around it, and processes it to provide our perception of the world.

One study has found that people with a condition called major depressive disorder are less sensitive to really cold temperatures. We have no idea why this might be! Is the depression causing a lower response to pain, or the other way round? Or are the temperature pain and depression circuits in the brain linked somehow? Flies, earthworms and zebrafish don't have the answer for us on this just yet but may well one day soon.



The Nine Dot Challenge!

What you Need

Your eyes

nine dot puzzle

What to do

1. Look at the nine dots

2. Can you join all of them up using a maximum of four continuous straight lines, without taking your imaginary pen off the screen?

3. You have 9 minutes to get to grips with the answer

What may happen

Want a clue? Think outside the box.

Nine dot solution

Did you get it?

There are many other different creative ways to solve this. For example, we didn't say how thick the line had to be, it could fill the whole screen and you could join all of the dots up in one go.

Why does it happen?

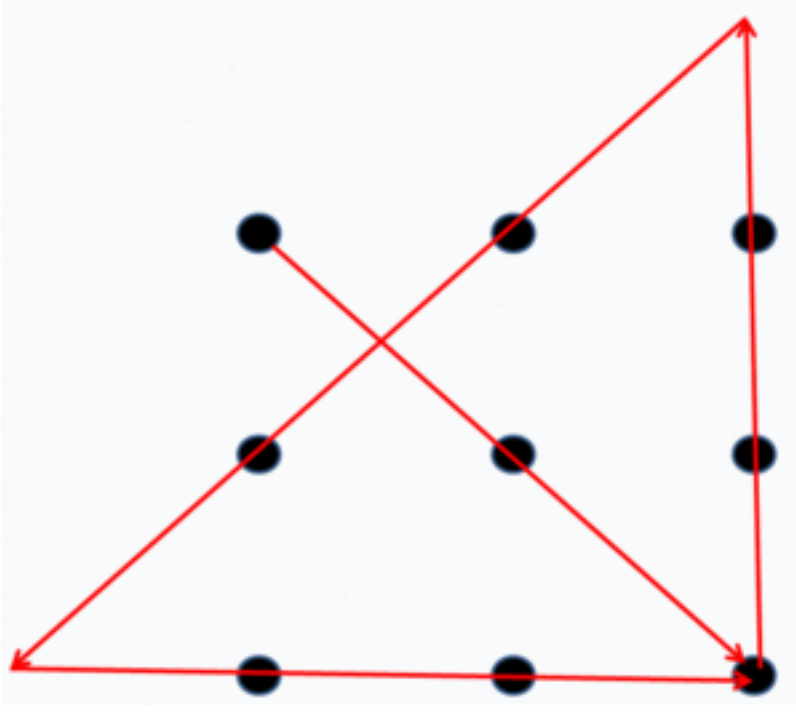
Which part of the brain is responsible?

The right side of the prefrontal cortex (the bit of your brain just behind your forehead)

Why is this happening?

Our minds have evolved to solve certain problems effortlessly, yet we struggle to solve others that require us to 'think outside the box'.

This 9 dot puzzle is an example of thinking creatively. Investigations over the



last century show that under laboratory conditions, so being watched by a researcher in a silent room, no one can solve this puzzle!

Why do scientists study this?

Scientists want to know whether you stimulate people to think outside the box and solve puzzles like this by tweaking with the activity of the brain. If they answer this question, they can learn more about how the brain works.

There are about 100 billion (1011) nerve cells in the brain and about 1000 trillion (1015) connections between them. That's a lot! That means in just one small cubic millimetre of human brain tissue there are more than 1 million nerve cells (106) and 1 billion (109) connections. Phew!

To allow us to think and to move, these nerve cells send signals to each other. How is this information encoded? The answer is that it's encoded by electronic pulses. So they're very brief, rapid, changes of electrical potential that lasts for 1/1000th of a second, travelling up and down the nerve cells, which are connected to each other.

Recently two Australian neuroscientists Synder and Chi took this information and changed the way people thought, using the power of electricity! They published the study in 2013, in the journal Neuroscience Letters. They took twenty two volunteers and gave them this 9 dot puzzle. How many people could solve this puzzle in 9 minutes? None!

Synder and Chi then split the group and half of people were fitted with something that looked like a shower cap, and attached to the shower cap were electrodes that sent short electrical signals. These carried

through the skull, and activated the nerve cells in the right side of the temple, the right prefrontal cortex. This group had ten minutes of electrical stimulation treatment, 2 milliamp current passing across their heads with the positive electrode applied to the right temple and the negative electrode on the left.

Following this treatment, 40% of the subjects then solved the problem. A control group meanwhile, to whom the electrodes were attached but no electrical current applied, were still all unable to solve the problem. So, they had altered behaviour by electrically stimulating a particular part of the brain.

According to Snyder and Chi, people find this puzzle so difficult because the dominant left temporal lobe uses prior knowledge of shapes to interpret the pattern of dots as a square with imposed rigid boundaries. And as the solution requires drawing lines outside of this shape, subjects think "inside the box" and don't spot it.

The electrical current, however, boosts activity on the more creative right side of the brain and reduces the activity in the creativity-suppressing left side, freeing the subject from their existing cognitive biases and enabling them to see the solution.

Intriguingly, one subject recruited by the researchers but not included in the analysis did immediately solve the puzzle without the benefit of electrical stimulation. But, on further questioning, he revealed having had a head injury as a child that damaged his left temporal lobe.

The researchers say this supports their theory, concluding that brain stimulation has the potential to facilitate those tasks that our minds are not well adapted for.

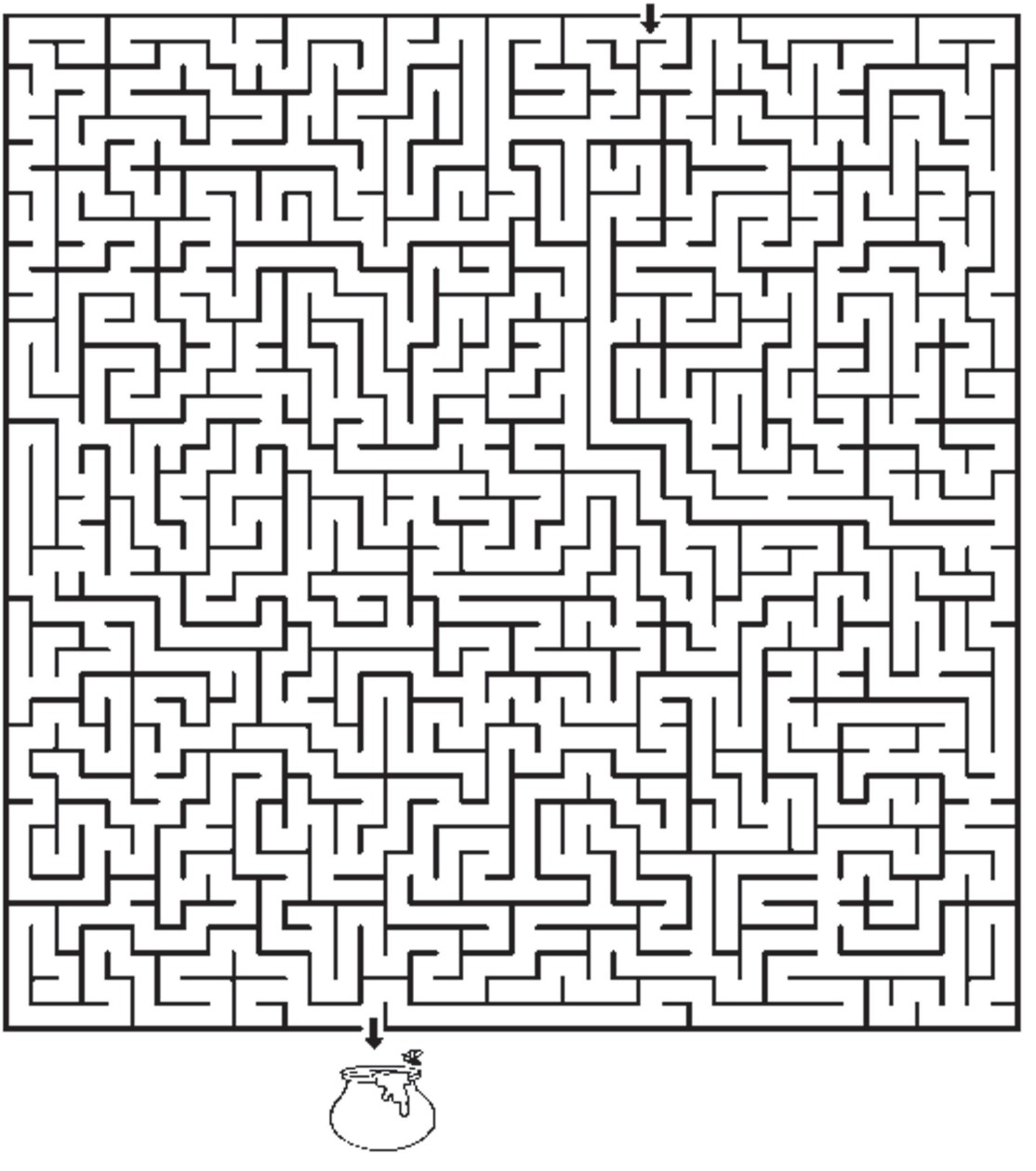
Word Search Puzzle **Scientific Instruments**

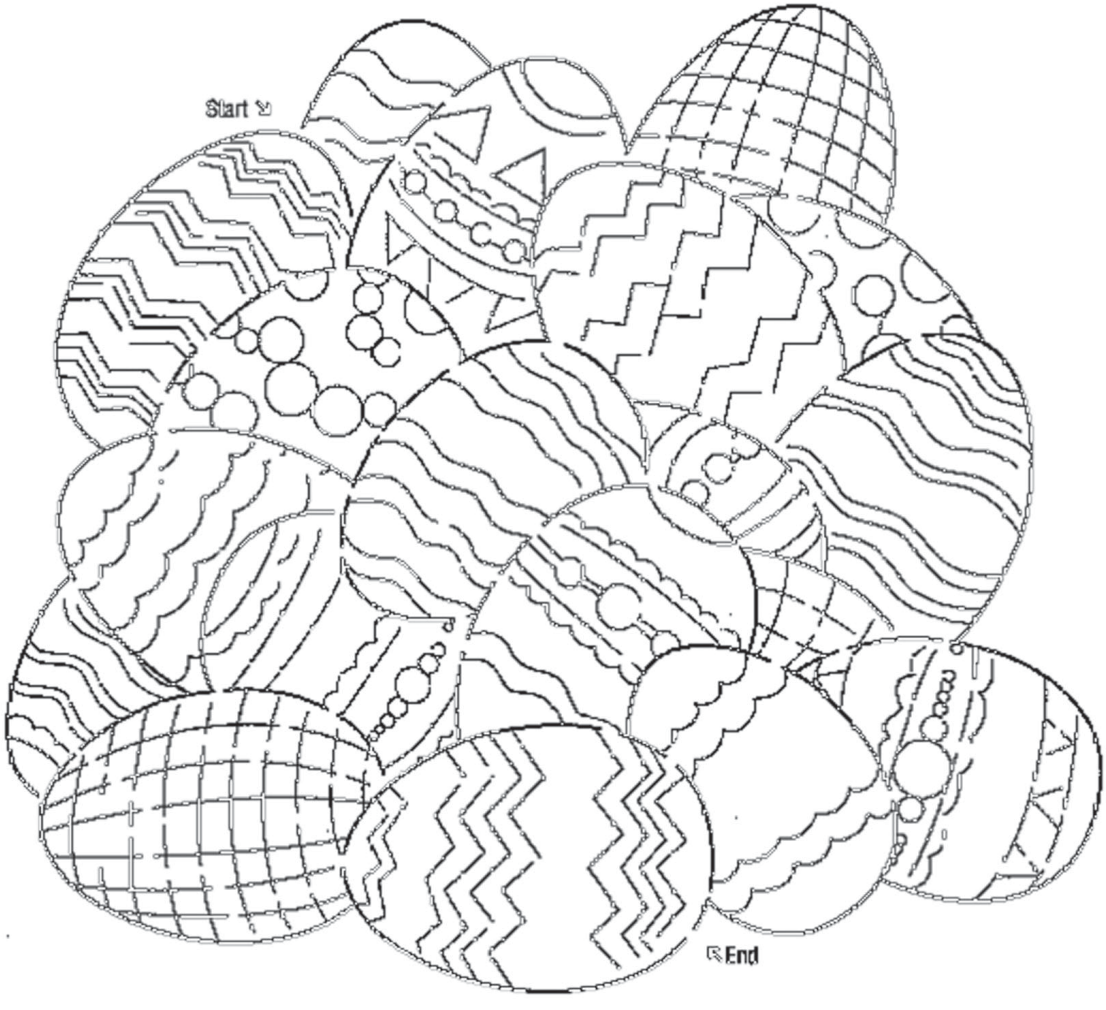
V	B	M	E	R	T	Y	U	K	H	M	L
C	X	A	Z	B	G	A	E	F	A	N	B
B	U	N	S	E	N	B	U	R	N	E	R
M	N	T	B	A	W	E	R	X	D	C	V
L	K	L	A	K	F	D	L	A	S	E	R
H	J	E	T	E	G	S	C	A	L	E	P
G	F	D	T	R	H	J	K	L	I	O	I
S	C	I	E	N	T	I	S	T	D	Y	U
M	I	C	R	O	S	C	O	P	E	T	R
Q	A	S	Y	M	A	G	N	E	T	W	E

MAZES!

FOR OLDER KIDS

Dip the Apple in the Honey!





The "Discobolus" is a copy of a Greek statue c. 5th century BC. It represents an ancient Olympic discus thrower

Olympics

THE GAMES

The ancient Olympic Games were primarily a part of a religious festival in honor of Zeus, the father of the Greek gods and goddesses. The festival and the games were held in Olympia (see 'Did you know' in the glossary), a rural sanctuary site (model shown here, courtesy of the British Museum) in the western Peloponnesos.

The Greeks that came to the Sanctuary of Zeus at Olympia shared the same religious beliefs and spoke the same language. The athletes were all male citizens of the city-states from every corner of the Greek world, coming from as far away as Iberia (Spain) in the west and the Black Sea (Turkey) in the east.

The sanctuary was named in antiquity after Mt. Olympos (see 'Did you know' in the glossary), the highest mountain in mainland Greece. In Greek mythology, Mt. Olympos was the home of the greatest of the Greek gods and goddesses.

The ancient Olympic Games began in the year 776 BC, when Koroibos, a cook from the nearby city of Elis, won the stadion race, a foot race 600 feet long. The stadion track at Olympia is shown here. According to some literary traditions, this was the only athletic event of the games for the first 13 Olympic festivals or until 724 BC. From 776 BC, the Games were held in Olympia every four years for almost 12 centuries.

Contrary evidence, both literary and archaeological, suggests that the games may have existed at Olympia much earlier than this date, perhaps as early as the 10th or 9th century BC.

What's that, you ask?

A series of bronze tripods have been found at Olympia, some of which may date to the 9th century BC, and it has been suggested that these tripods may in fact be prizes for some of the early events at Olympia. Source: Deutsches Archaologisches Institut, Athen

The marathon was NOT an event of the ancient Olympic games. The marathon is a modern event that was first introduced in the Modern Olympic Games of 1896 in Athens, a race from Marathon northeast of Athens to the Olympic Stadium, a distance of 40 kilometers.

The race commemorates the run of Pheidippides, an ancient "day-runner" who carried the news of the Persian landing at Marathon of 490 B.C. to Sparta (a distance of 149 miles) in order to enlist help for the battle. According to the fifth century B.C.ancient Greek historian Herodotus, Pheidippides delivered the news to the Spartans the next day.

The distance of the modern marathon was standardized as 26 miles 385 yards or 42.195 km. in 1908 when the Olympic Games were held in London. The distance was the exact measurement between Windsor Castle, the start of the race, and the finish line inside White City Stadium.

NUDITY AT THE GAMES?

There are two stories relating to the question of nudity at the ancient Olympic Games. One story states that it was a runner from Megara, Orsippos or Orrhippos who, in 720 B.C. was the first to run naked in the stadion race when he lost his shorts in the race. Another tradition is that it was the Spartans who introduced nudity to the Olympic Games in the 8th century B.C. as it was a Spartan tradition. It is not clear if the very first recorded victor at Olympia, Koroibos, who won the stadion race in 776 B.C. wore shorts or not. It seems fairly clear that by the late 8th century nudity was common for the male contestants.

FROM ANCIENT TO MODERN

Although the ancient Games were staged in Olympia, Greece, from 776 BC through 393 AD, it took 1503 years for the Olympics to return. The first modern Olympics were held in Athens, Greece, in 1896. The man responsible for its rebirth was a Frenchman named Baron Pierre de Coubertin, who presented the idea in 1894. His original thought was to unveil the modern Games in 1900 in his native Paris, but delegates from 34 countries were so enthralled with the concept that they convinced him to move the Games up to 1896 and have Athens serve as the first host.

THE OLYMPIC FLAME

The idea of the Olympic torch or Olympic Flame was first inaugurated in the 1928 Olympic Games in Amsterdam. There was no torch relay in the ancient Olympic Games. There were known, however, torch relays in other ancient Greek athletic festivals including those held at Athens. The modern Olympic torch relay was first instituted at the 1936 Olympic Games in Berlin.

The Olympic Oath was introduced in 1920.

The Modern Olympic Games

From Grolier Online's New Book of Knowledge

The revival of the Olympic Games began with Baron Pierre de Coubertin (1863–1937) of France. Coubertin was greatly interested in education, and he firmly believed that the best way to develop the minds of young people was to develop their bodies as well; learning and athletics should go together. After he visited the ruins of ancient Olympia, it occurred to Coubertin that perhaps the best way to generate widespread acceptance of his theory was to resurrect the Olympic Games. He hoped the new Games would bring back the ideals of physical, mental, and spiritual excellence displayed in the ancient Games, as well as build courage, endurance, and a sense of fair play in all who participated. In addition, he hoped the Games would turn the tide he saw worldwide of the growing commercialism of sports.

In 1892, Coubertin first introduced the idea of starting the Olympic Games again. Few people were ready to accept his idea. But in 1894 Coubertin founded the International Olympic Committee (IOC) and began planning the first modern Olympiad.

The first modern Olympic Games were held in 1896 in Athens, Greece — a fitting place to rekindle the spirit of the early Greek Games. Coubertin remained president of the International Olympic Committee until 1925. In this office he directed the course the Games were to take. He wrote the Olympic Charter, protocol, and athletes' oath, and he also planned the ceremonies.

Although the modern Olympic Games are patterned after the ancient Greek Games,

there are important differences. Unlike ancient Greece, modern nations have not stopped wars for peaceful athletic competition. Because of World War I, Games were not held in 1916. Nor were they held in 1940 and 1944, during World War II.

The original Olympics were always held at Olympia. Almost every modern Olympiad is celebrated in or near a different city of the world. The earlier Games were open only to Greek citizens and athletes from other Mediterranean countries. The modern Games encourage all nations to compete. A person may enter if his or her country has a National Olympic Committee (NOC) that is recognized by the International Olympic Committee. Events for women have become a major interest in the modern Games, and the winners receive honors equal to those given the male winners.

The ancient Greeks furthered culture by giving honors for cultural achievements at the Olympic Games. The modern Olympics hold an arts festival, where the culture of the host country is showcased in various art forms.

Footraces, jumping, discus and javelin throwing, boxing, wrestling, and some other events were carried over from the original Olympic Games. But such present Olympic contests as cycling, canoeing and sailing, football (soccer), basketball, judo, rifle shooting, and water polo were unknown in early times. The modern pentathlon tests an athlete's all-around ability in swimming (300-meter freestyle), cross-country running (4,000 meters), fencing with the épée, horse show jumping, and shooting with a target pistol at 10 meters.

One of the most grueling events of the modern Olympics is the marathon. This footrace over a distance of 26 miles, 385 yards (42.195 kilometers) is a supreme test of the runners' endurance. The marathon was not run at Olympia, but it has its origin in ancient Greece. In 490 B.C. the Athenians defeated an army of invading Persians at Marathon, which is northeast of Athens. From there, Pheidippides, a champion runner in the Olympic Games, carried the news of victory to the people of Athens. To do this he had to run a great distance. Once he reached Athens and gasped out his news of victory, he died. It is in his honor that the marathon race is run.

In 1924, the Winter Games became a new feature of the modern Olympics. Such cold-weather sports as pair and figure skating, ice hockey, bobsledding, and the biathlon (rifle shooting on a cross-country ski course) could never have developed in the warm climate of Greece (although figure and pair skating and ice hockey had been included in previous modern Games). Until 1992, the Winter Games were held in the same year as the Summer Games. Beginning in 1994, the Winter and Summer Games were held two years apart, on separate four-year cycles.