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Entrance to the Climate Change Conference hall near Paris

PARIS CLIMATE CHANGE CONFERENCE

This year's annual United Nations (U.N.) Climate Change Conference was held near Paris, France's capital city. The two-week conference began on November 30. Around 40,000 people took part. They included leaders, officials, climate experts and scientists from over 190 countries and international organizations.

Scientists say that the amount of carbon dioxide (CO₂) in the atmosphere is now higher than it has been for 800,000 years. They first noticed that CO₂ in the air was increasing over 60 years ago. Everyone agrees that most of this extra CO₂ comes from human activity. This is mainly the burning of fossil fuels, such as oil, natural gas and coal. In most countries, fossil fuels are used for generating electricity, heating, transport, and cooking.

Around 30 years ago scientists began to suspect that extra CO₂ in the atmosphere (together with other gases such as

methane) was affecting temperatures and the climate in some parts of the world. They said that these gases, or **emissions**, were acting like a greenhouse. Nowadays, nearly all scientists agree that "greenhouse gases" are causing average temperatures to rise, and climate change in some parts of the world.

Over the past 25 years the U.N. has arranged many large climate meetings, or summits. These have been organized to try to get countries to agree to reduce the emissions they produce. Yet this has led to disputes, arguments and few agreements. All countries have been asked to burn less fossil fuel and make more "sustainable" or "clean" energy.

Electric power made from wind turbines, solar power, hydroelectric dams, and the movement of waves and tides all create sustainable or clean energy. Power made from these sources does not

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produce extra CO₂. These methods of making electric power are known as “renewables”. Unlike fossil fuels, renewables should never run out. Nuclear power stations do not produce additional CO₂. However, they do create dangerous nuclear waste. This has to be stored carefully.

In 1988 the U.N. set up the Intergovernmental Panel on Climate Change (IPCC). Its job is to monitor climate change. In a recent study the IPCC said that world temperatures have risen by roughly 0.9°C over the last 100 years. This figure is an average. So the temperature rise is not evenly spread all over the world. Some places may have become hotter while others might have gotten cooler.

In recent years, the IPCC has produced several reports. If emissions are not reduced, the reports say, average world temperatures will start to rise more quickly. The IPCC predicts that by 2100 (depending on by how much emissions are reduced) this increase will be between 1.5°C and 4.5°C. If the increase goes above 2°C, the IPCC thinks there are likely to be many problems. These include: more powerful storms and floods, greater coastal flooding (as sea levels rise), food and water shortages, and increased poverty.

The 2009 U.N. Climate Change Conference took place in Copenhagen, the capital of Denmark. At that time, many people expected all countries to sign up to a binding agreement to reduce their emissions. They were disappointed. The leaders of the countries arrived for the last two days of the meeting. Most expected to sign an agreement. Yet there were too many disagreements. The conference ended in failure.

Many of these disagreements are about which countries caused the problem and who should pay for it. Nations are often described as “developed” (or wealthy) and ‘developing’ (less wealthy). Some developed countries, such as Britain, the U.S., Japan, and several European nations, began to industrialize over 150 years ago. This meant that factories and homes started to burn fossil fuels, especially coal.

China, India and Brazil are examples of developing nations. They industrialized much later than the developed nations. Today, these three countries burn large amounts of fossil fuels. Yet they started doing this much more recently. Some countries therefore argue that developed nations have caused the problem. This is because they have been producing greenhouse gases for much longer. These countries want developed nations to pay for the developing nations’ renewable energy projects. They also want them to pay for damage caused by floods and storms. This is all expected to cost a huge amount of money.

To avoid another failure like Copenhagen, the most recent U.N. climatechangemeetingshavenotsetout to make any lasting agreements. They have been used to prepare for this year’s Paris meeting. For example, over the last 12 months all countries have had to declare by how much they will reduce their emissions. These declarations are called “Intended Nationally **Determined** Commitments” (INDCs). In total, these are meant to ensure that the IPCC “warming” figure of 2°C is not exceeded.

Not everyone agrees with what the IPCC says. Some (many of whom are not scientists) insist that extra greenhouse gases in the air are not

the reason for climate change. Higher average temperatures, they say, are natural and not man-made. During the Earth’s long history, the planet has got warmer and colder. Previous warm periods happened long before humans started to burn fossil fuels.

Others agree that extra CO₂ in the atmosphere is increasing average world temperatures. Yet they disagree with the IPCC’s predictions. They believe that the warming effect is much less. Average world temperatures, they say, may increase, but at a slower rate. Recent studies suggest that extra CO₂ in the atmosphere is good for agriculture, or farming. It makes food crops and other plants grow better. Satellite pictures show that there has been a 14% increase in “green vegetation” on the Earth over the last 30 years.

Burning fossil fuels is still the least expensive way of making electric power. Electricity made from renewables costs far more money. Also, wind and solar cannot produce large amounts of electricity all the time. Some people think that big U.N. meetings and complicated agreements will never solve the fossil fuel problem. The solution, they say, is new technologies. If new technologies could create power that’s less expensive than fossil fuels, everyone will stop using them.

Six months ago an international group of well-known scientists set up a new project. It’s called the Global Apollo Programme. They want governments and the world’s best scientists, technicians and engineers to work together. Their plan is to create new technologies that produce large amounts of clean electric power. This electric power, they say, must be less expensive than burning fossil fuels. They hope to achieve this within the next ten years. ■



PARIS2015
UN CLIMATE CHANGE CONFERENCE

ANCIENT PEACHES

Researchers in China have made a surprising discovery. Workers building a road uncovered eight peach pits, or stones. These woody husks are found in the middle of peaches. Their scientific name is endocarps. A peach tree seed is inside the endocarp. The pits looked as if they had only recently been thrown away. Yet tests showed that they are around 2.5 million years old.

Peach trees can reach a height of 33 feet (ten meters). Nectarines are a type of peach. Peaches have a slightly fuzzy or hairy skin. Nectarines are smooth. It's known that peach trees originally came from China. These trees are now grown in many parts of the world. The Romans called peaches "Persian apples". This was because they thought that the fruit came from Persia. Most of what was Persia is now Iran.



Fossilized peach pit (coin for scale) (Tao Su / PSU)

China still grows more peaches than any other country. Chinese legends say that peaches could protect people from evil spirits. Eating the "Peaches of [Immortality](#)" was believed to make someone live forever. There are similar stories in Korea. In Japanese folklore, a young man called Momotaro is a popular hero. His name means "peach boy". In China, brides often decorate their hair with flowers from peach trees.

Several ancient Chinese books mention peaches. These texts are

around 2,500 years old. Before the recent discovery, the earliest known peach stones were about 8,000 years old. The researchers are surprised that the ancient pits look so similar to modern-day ones. They have the same oval shape and grooves on the sides. The researchers believe that the ancient peaches were about two inches (five centimeters) across. Today's peaches are bigger. This is because, over time, peach trees have been cultivated, or specially bred, to grow bigger fruit.



Peach tree

The researchers were amazed by the age of the stones. At first, they used a method called radiocarbon dating to find out how old they were. Radiocarbon is a type of carbon found in all living things. After a living organism dies, the radiocarbon breaks down, or decays. It does this at the same speed each year. Therefore, by measuring the amount of remaining radiocarbon, scientists can work out when an organism died.

However, radiocarbon can only date things less than 50,000 years old. The radiocarbon dating did not work. Yet it proved that the pits were more than 50,000 years old. The researchers then studied the rocks in which the stones were found. These studies showed that the rocks formed during a period known as the Late Pliocene. This was 2.5 million years ago.

The pits' age means that these peaches grew before ancient humans, or hominins, moved to this part of the world. The researchers think that after they arrived, peach trees began to spread to other parts of China. By eating the peaches, the ancient humans helped to [disperse](#) their seeds.

Nowadays, not many wild peach trees remain. The researchers hope that the ancient peach pits will help them to work out how peach trees evolved. For example, they should be able to discover how much of a modern-day tree is "natural" and how much has been "cultivated" by humans. ■

CUTTLEFISH CLOAK

Cuttlefish are found in all the world's oceans. They are often called the "chameleons of the sea". Chameleons are lizard-like creatures. They are famous for being able to change color. By matching the surrounding colors, chameleons can be difficult to see. Cuttlefish can also change their color. They do this to hide from marine creatures that prey on them.

Scientists in the U.S. have recently done a number of experiments with cuttlefish. These suggest that cuttlefish have another way of hiding. They are able to lower the weak electrical signals that they emit, or give off. Sharks can pick up these signals. By covering up, or cloaking, their electric signals, cuttlefish are less likely to be detected by nearby sharks.

Cuttlefish are not a fish. Like octopuses and squid, they have tentacles. These are used for catching the creatures they feed on such as smaller fish and crabs. The largest

cuttlefish are about 9.8 inches (25 centimeters) long. They are believed to be one of the world's most intelligent invertebrates. These are animals that do not have a backbone, or spine.

Several bigger marine creatures prey on cuttlefish. Sharks, dolphins and seals all eat them. Humans also catch cuttlefish. Dishes that contain cuttlefish are popular around the Mediterranean Sea and in parts of Asia.

Sharks have eyes on the side of their head. They cannot see directly in front of them. Instead, sharks have special sensors on their snouts, or noses. These are able to detect faint electrical charges given off by other creatures in the sea. This is known as electroreception. When a shark picks up these electrically charged particles, it opens its mouth and bites down.

Some types of fish are able to create a powerful electric current. Electric eels are an example. These freshwater fish are found in rivers in South America. They can produce 500 volts. The fish use this powerful electric charge to stun their prey.

Cuttlefish do not deliberately produce electricity like an electric eel. They have small tube-like openings around their mouths and the edge of their mantle. This is the main part of their body. The small openings are called siphons. A tiny current of ions, or charged particles, are given off by a cuttlefish's siphons. These ions come from the seawater. When not moving, or at rest, a cuttlefish produces between ten and 30 microvolts of electricity. This is roughly 75,000 times weaker than a small AAA battery.

For one experiment, the scientists put a cuttlefish in a glass tank full of seawater. One side was next

to a white screen. The scientists then projected outline images, or silhouettes, of different marine creatures on the screen. The images were made to look as if they were approaching the cuttlefish. They started small and then got bigger and bigger.



Cuttlefish (David Sim)

When a crab silhouette was shown, the cuttlefish did not take any notice. Yet it reacted differently to the outline of a shark getting closer. Then, the cuttlefish covered its siphons with its tentacles and froze, or did not move. Later, the scientists tested cuttlefish with real blacktip and bonnethead sharks. When their siphons were covered, the number of times the sharks tried to bite the cuttlefish dropped to 30%. The scientists say that its like the cuttlefish are putting on a cloak to make them invisible. Covering their siphons and staying still lowers the cuttlefish's electric output to six microvolts.

Cuttlefish have another way of defending themselves against predators. Like octopuses, they can suddenly release a dark liquid. This is often called "ink". The cuttlefish's ink can distract a predator while it swims away quickly. ■

EU-TURKEY AGREEMENT

The leaders of the European Union (EU) and Turkey made an agreement on November 29. The EU wants Turkey's help to control, or

manage, the number of migrants trying to enter Europe.

During the last ten months hundreds of thousands of people have illegally travelled from Turkey to Greece. To make the trip the migrants pay smugglers for a place on small boats. Some of these boats have sunk. Many have drowned. Most of the migrants are younger men. Yet some older people and couples with children have also been making the journey.

Many of the migrants are from Syria. Most are trying to get away from the fighting in their country. The war in Syria began over four years ago. Millions of Syrians are now living in large tented camps in Turkey, Lebanon and Jordan. Many of those trying to get to Greece have been living in camps in Turkey for several years. Other migrants who have been traveling to Greece come from Afghanistan, Iraq, Bangladesh, and Pakistan.



Migrants from Syria and Iraq arrive on the Greek island of Lesbos after traveling from Turkey

All of the migrants want to move to countries that are members of the European Union (EU). There, they hope to find jobs and improve their lives. Greece is a member of the EU. Therefore after the migrants arrive in Greece, they can travel to other EU countries. Under international law, EU member countries must help asylum seekers. These people are often called refugees. Their lives would

be in danger if they returned to their own countries.

However, many people traveling to Greece are what are known as economic migrants. Their lives are not in danger. Yet in their countries there are few jobs and life is difficult. International law says that economic migrants can be sent back to the countries from which they came.

Six months ago Angela Merkel, the chancellor of Germany, said that her country would accept at least 800,000 refugees. Many people praised Mrs. Merkel. Others believe that what she said was wrong. They argued that it encouraged even more migrants to try to make the journey.



Migrants in Hungary walking to Austria (J. Seidler)

The migrant crisis has caused arguments amongst EU member countries. EU leaders say that all EU members must accept some of the migrants. Several Eastern European countries are refusing to do so. Leaders in Hungary built a fence along their country's border with Macedonia. This was to stop tens of thousands of migrants from entering their country. These people had left Greece. Once they reached Hungary, it was easy for them to go to Austria, Germany and other EU countries. As more and more migrants arrived, EU leaders realized that something had to be done to control the numbers.

EU leaders say that the new EU-Turkey agreement is meant to “stop illegal migration and allow legal migration”. As part of the

agreement, Turkey will stop migrant boats from leaving its shores. The EU will pay Turkey €3 billion (\$3.3 billion) every year. This money is to be spent on improving the lives of the 2.2 million Syrian refugees in the country.

Every year 400,000 Syrians living in refugee camps in Turkey will be allowed to move to the EU. These refugees will be “shared” between EU members. EU countries now plan to start **deporting** economic migrants. Turkey has agreed to accept them. Many of these migrants are from Afghanistan, Pakistan and Bangladesh.

Other parts of the agreement include visa free travel for Turkish people to EU countries. Many years ago there were talks about Turkey joining the EU. These talks are to be revived, or restarted. ■

SMOG ALERT IN BEIJING

Large cities in China are known for bad air pollution. Government officials in Beijing, the capital city, introduced an air pollution alert system two years ago. There are four levels: blue, yellow, orange, and red. Red is the most **hazardous**. On December 1, there was an orange alert. Then, seven days later, a red alert was announced. This was the first time that this has happened.

Air pollution in cities is often called smog. This word comes from “smoke” and “fog”. It was first used in Britain in the 1950s. Then, many people burned coal to keep their houses warm. Smog would form if the weather was foggy and there was little wind. Smoke particles became attached to the water droplets in the air. It was difficult to see very far in the thick smog. Breathing in the smoke particles made some people ill.

In China, the air pollution often gets worse when the weather is colder and there is not much wind. Several types of pollutants cause the smog. Much of it comes from power stations that burn coal. Around 60% of all the electricity used in China comes from coal-fired power stations.



Smog in Beijing

Many of China's industries, such as steel and cement making, create a lot of air pollution. Big construction, or building, projects produce huge amounts of dust particles. Most of China's many trucks use a low-grade type of fuel. This adds to the air pollution. Roads in the cities like Beijing are full of cars and buses.

The World Health Organization (WHO) is part of the United Nations (U.N.). Its job is to give public health advice to governments around the world. Air pollution monitors or sensors measure the levels of microscopic PM2.5 particles in the air. These are particles that are less than 2.5 microns (or 2.5 millionths of a meter) across. The WHO says these are dangerous because they are small enough to get into a person's lungs and bloodstream. Breathing in too many of these tiny particles can cause serious illnesses.

The WHO says that a PM2.5 level of 25 micrograms per cubic meter is safe. Yet anything above this could be dangerous. On December 8, the PM2.5 reading in Beijing was

about 300. In the past some cities in northern China have recorded over 500 micrograms per cubic meter.

A red alert is given when the air pollution is expected to last for three days or more. All schools are advised to close. Construction sites stop work. Over 100 factories near the city that produce a lot of air pollution have to shut down. Around 23 million people live in Beijing. Five million cars travel in and out of the city every day. During a red alert, cars whose license plates end in an odd or even number cannot be used on certain days. Odd numbered cars can drive for one day. Then, the following day, it is the “even numbered” cars’ turn.

Many people in Beijing were surprised when the red alert was announced. They claim that the air pollution was worse during the orange alert the previous week. ■

“MEIN KAMPF”

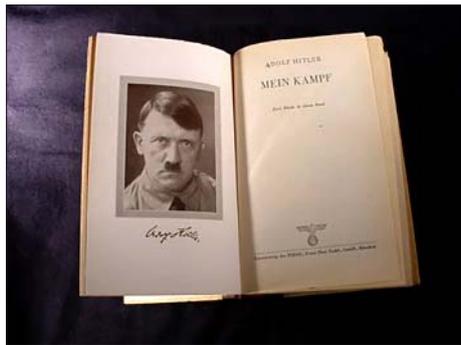
An organization in Germany will start selling copies of an [infamous](#) book at the beginning of 2016. The organization studies German [contemporary](#), or recent, history. Adolf Hitler wrote the book 90 years ago. It is called *Mein Kampf*, which means “My Struggle”.

Adolf Hitler (1889 – 1945) was the leader of Nazi Germany. Ten years before he became the German chancellor, Hitler was arrested. In 1923 he and several followers tried to use force to take over the government of Bavaria. They were unsuccessful. Bavaria is in the southern part of Germany. Today, it is one of the country’s 16 states.

As a punishment, Hitler was sent to prison for five years. Later, his sentence was reduced to 12 months.

While he was in prison Hitler wrote (or dictated) *Mein Kampf*. The book tells the story of his early life. It also sets out what Hitler believed Germany should do in the future. Some people say that *Mein Kampf* was “Hitler’s [manifesto](#)”.

In the book Hitler describes his hatred of Jewish people and people who support communism. He says that he believes Germans are superior to other races. Also included are arguments for getting rid of the country’s elected politicians. The book states that war should be used to expand Germany’s borders to the east.



Original copy of *Mein Kampf*

In 1933 Hitler’s Nazi Party finally took control of Germany. After this, every couple were given a copy of *Mein Kampf* on their wedding day. Ten million copies of the book were printed. When the Second World War ended in 1945, the [copyright](#) for *Mein Kampf* passed to the state of Bavaria.

Under German law, copyright lasts for 70 years after the death of the author. The law means that anyone who wanted to reprint *Mein Kampf* during this time had to get the state of Bavaria’s permission. The book’s copyright expires at the end of 2015. From the beginning of 2016, anyone will be able to reprint and sell *Mein Kampf*. They do not have to get permission or pay any money to do so.

Several years ago, the Bavarian government announced that it

would reprint a different version of the book. This new version would include [annotations](#), or notes. Written by experts in history and politics, the annotations would explain why what Hitler believed in was incorrect and dangerous. Bavarian officials were worried that some people would print the book to make money when its copyright expired. They said that the annotated version would reduce the likelihood of others reprinting the book.

The Bavarian government arranged for the contemporary history organization to produce the new version of *Mein Kampf*. However, many Jewish groups complained about its plan. Some people think that nobody should be allowed to read *Mein Kampf*. They believe that it could encourage certain people to have similar thoughts, or ideas, to Hitler’s.

Two years ago the government of Bavaria declared that it would not produce the new version of the book. It decided to do this to respect all those who had died in the Holocaust. This is the name given to the murder of millions of people by the Nazis during the Second World War (1939 – 1945). Around six million Jews and two million Roma, or Gypsies, were killed in the Holocaust.

However, the contemporary history organization disagreed with Bavaria’s decision. Its scholars and historians said that they would complete the new version of *Mein Kampf*. They would also pay for it to be published. Around 4,000 copies are to be printed in two volumes. The two books have 1,948 pages in total and include 3,500 annotations. The price for both volumes is expected to be €59 (\$66). ■

DINOSAUR EGGS

Researchers from Canada have been studying dinosaur eggs. They now believe that very tiny holes, or pores, in the eggshells show what type of nest the eggs were laid in.

Dinosaurs first evolved around 230 million years ago. They lived on the Earth for about 165 million years. What happened to them is still a mystery. Some people believe that they all died out after a large asteroid hit the Earth 66 million years ago. Others believe that huge volcanic eruptions poisoned the air and blocked out the Sun around the same time.



Dinosaur eggs (Steve Storer)

Billions of dinosaurs must have lived on the Earth during the 165 million years that they existed. The females of all dinosaur species laid eggs. Therefore over this great length of time, billions of eggs must have been laid. Most hatched or were taken by predators. This means that finding fossilized dinosaur eggs is a rare event.

So far, dinosaur eggs have been unearthed in the U.S., France, Spain, Mongolia, China, Argentina, and India. The largest were discovered in China in the mid-1990s. These are two feet (60 centimeters) long and eight inches (20 centimeters) across. Some dinosaur eggs were round. Others were oval shaped. Several eggs have been found with [embryos](#) inside them. When this

happens, it is usually possible to work out which type of dinosaur they belonged to.

Palaeontologists, or scientists who study fossils, believe that some dinosaurs laid as many as 21 eggs in one nest. Even though some eggs have survived as fossils, the nests have not. How dinosaurs built their nests and looked after their eggs is not known. To try to answer these questions, the researchers decided to look at the eggs of today's birds and crocodiles.

Birds, crocodiles and dinosaurs are all related. Scientists are sure that modern-day birds are related to dinosaurs. This was first suggested many years ago. Then scientists noticed that there are similarities between birds' skeletons and the fossilized skeletons of some dinosaurs. Crocodiles lived at the same time as the dinosaurs. Whatever wiped out the dinosaurs did not kill all the crocodiles. Birds seemed to have evolved very quickly after the dinosaurs disappeared. Yet crocodiles have hardly changed over the last 200 million years.

The researchers studied the eggs and nests of many bird and crocodile species. Most birds build nests and lay their eggs inside them. Then, they sit on their eggs. This keeps them warm and helps them to hatch. Crocodiles bury their eggs in sand or cover them with vegetation and leave them to hatch.

Using powerful microscopes, the researchers looked at bird and crocodile eggshells. They noticed something different. Both types of eggs have pores, or very tiny holes, in the shells. Yet the number of holes is not the same. When compared with the eggs of birds, crocodile eggs have many more pores. So their "porosity" is much greater.

The researchers then looked at fossilized dinosaur eggs. These ranged from 150 million to 70 million years old. Even though they were very old, it was possible to see the number of pores. The porosity of some is the same as the crocodile eggs. The porosity of others is more like birds' eggs. The researchers believe that this shows if the eggs were "looked after" in a nest or "buried and left".



Crocodile eggs

Bigger and more primitive dinosaurs seemed to have buried their eggs. Less ancient and smaller dinosaurs laid their eggs in open nests. It seems that as dinosaurs evolved, how they built their nests and looked after their eggs also changed. ■

SKY SHEPHERDS

Scientists have been using drones to improve the health of Spanish ibex. These animals are also called Iberian ibex or Spanish wild goats. Iberia, or the Iberian Peninsula, is the landmass that includes Spain and Portugal. Drones are remote-controlled pilotless, or unmanned, aircraft.

There are many types of wild goats. Several are known as ibex. Few wild goat species remain in Europe. Thousands of years ago these animals were very common. Ancient cave paintings in France include pictures of ibex. Some of these

drawings are over 25,000 years old. These animals are the ancestors of modern-day goats, or the goats kept on farms.

Today, the Spanish ibex is mostly found in eastern Spain. A few herds still live in the central part of the country and northern Portugal. The males' large horns curve backwards. These have ridges on the outer curve. Some are over 2.3 feet (70 centimeters) long. Fully-grown males are about 2.5 feet (75 centimeters) tall. Most of their body fur is light brown. Females are the same color. Yet they are much smaller than males and have short horns.

The animals live in rocky areas. They can move very quickly. Ibex will leap and bound over uneven ground and up and down steep mountainsides. They feed on grasses and other types of vegetation. Male Spanish ibex use their horns to fight against each other. This happens during the mating season, or November and December. Males and females live in separate herds. These join together in the mating season. The mixed groups then stay with each other for most of the winter. The young, or offspring, are born in the middle of May.



Male Spanish ibex (Javier García Diz)

Both males and females can make loud whistling noises. These are alarm calls. Ibex make these sounds if they sense danger. This could be the approach of larger

animals or humans. When a herd hears an alarm call they run to a safer place. Often this is the very steep side of a hill or mountain.

Spanish ibex can suffer from a type of [parasite](#). The tiny creature, or mite, burrows into the skin. This is where it lays its eggs. The mites cause itchy rashes. These types of infections are known as scabies. In some animals, such as dogs, they are called mange. These infections can be passed to other animals and humans.



Female Spanish ibex (I. Barrios / J. Ligeró)

The drones used by the scientists are designed to fire darts. These sedate the wild goats, or send them to sleep. Following on the ground, the scientists take blood samples from the sedated goats. These are tested for scabies and other diseases. The wild goats can also be taken away for treatment. Trying to get near the animals on foot is difficult. What's more, when hit by a dart, an ibex may keep running for ten minutes. Following them on the ground is difficult. The drones can easily track the goats until they fall down.

Sometimes the scientists use two drones at the same time. Then, the pilotless aircraft are used to "herd" the goats to a certain area. Previously, the scientists would have left food, which contains medicines, in this place. This explains why the scientists call the drones "sky [shepherds](#)". ■

CHOGM IN MALTA

The Commonwealth Heads of Government Meeting (CHOGM) began on November 27. It lasted for three days. The meeting, or summit, was held in Malta.

The CHOGM takes place every two years. The Commonwealth's official name is the Commonwealth of Nations. Currently it has 52 member countries. Many of these countries' leaders attended the summit. Senior politicians or officials represented others. Most of the talks were about climate change, migration, government corruption, and terrorism.

Originally all members of the Commonwealth were former colonies of Britain. Not all nations that were British colonies are members. Some, such as Egypt and Iraq, have chosen not to join. Three African countries that were not former British colonies have recently joined the Commonwealth. These are Rwanda and Cameroon, which were colonies of France, and Mozambique, a former Portuguese colony.



CHOGM
Malta 2015

As well as being the Queen of the United Kingdom (UK), Queen Elizabeth the Second is the head of the Commonwealth. Britain's king or queen is the head of state of 16 Commonwealth member countries. These nations are known as Commonwealth realms. They include: Australia, New Zealand, Canada, Jamaica, and Papua New Guinea (PNG).

To be a Commonwealth member a country must be a democracy and allow free speech. It must also treat

people of all races and religions equally, allow free trade, and have a desire for world peace. Members that do not follow these rules can be expelled or suspended. In the past, Commonwealth members such as Nigeria, Pakistan, Fiji, and Zimbabwe have all been suspended. Most Commonwealth countries have similar political and legal systems.



Queen Elizabeth the Second, head of the Commonwealth, with Malta's prime minister, Joseph Muscat

The Commonwealth countries are home to 2.1 billion people. This is almost one-third of the world's population. With 1.26 billion, India is the member with the most people. Tuvalu is the smallest. About 10,000 people live on this Pacific island. Commonwealth member countries are estimated to be responsible for roughly 20% of the global economy. This figure is expected to increase. Currently, India has one of the fastest-growing economies in the world.

Malta is made up of three larger islands and many uninhabited small ones. About 445,000 people live on these Mediterranean islands. The British took control of Malta in 1814. It soon became an important naval base. The Suez Canal opened in 1869. After this, many ships sailing from Britain to India and back stopped at Malta.

Malta became an independent nation in 1964. At first, it was a Commonwealth realm. In 1970 the country decided to appoint its own president as head of state. Now Malta

is a republic. The president has few powers. The prime minister runs the country. The country's parliament is in Valletta, the nation's capital city. Malta joined the European Union (EU) in 2004. Four years later, it began to use the euro as its currency. Currently, Joseph Muscat is Malta's prime minister.

Queen Elizabeth is now 89 years old. She did not attend the last CHOGM summit. It was held in Sri Lanka. Prince Charles, her eldest son, represented her at that meeting. Queen Elizabeth is known to take a great interest in the Commonwealth. Some people suggested that she decided not to go to Sri Lanka because of the long distance to travel. Others thought that she wanted Prince Charles to take over her Commonwealth duties.

However, Queen Elizabeth and her husband, the Duke of Edinburgh, went to the Malta summit. Prince Charles and his wife, the Duchess of Cornwall, accompanied them. Ban Ki-moon, the leader of the United Nations (U.N.), and France's president, François Hollande, also accepted invitations to attend. ■

OIL PRICE FALL

The Organization of the Petroleum Exporting Countries (OPEC, pronounced "oh-pec") has 13 member countries. All are large oil producers.

Oil is used for transport, heating and cooking. Many countries burn large amounts of oil to generate, or make, electricity. The price of oil affects individuals, families, companies, and countries' economies. A higher oil price often means an increase in food prices (because transport costs more) and more expensive gasoline.

Oil is what's known as a "commodity". Many people argue that, in the modern age, oil is the world's most important commodity. Commodities are goods that have the same "worldwide" price. It does not matter who produces them or where they come from. Examples of other commodities are: corn, wheat, gold, silver, tin, copper, sugar, and cocoa beans, which are used to make chocolate. Oil is priced in U.S. dollars and measured in units called barrels. One barrel represents 42 gallons of oil.



OPEC building in Vienna, in Austria

OPEC usually meets twice a year. These meetings are normally held at the organization's headquarters in Vienna, Austria's capital city. The latest one was held in the city on December 4. The main reason for these meetings is to discuss the price of oil and agree on how much each OPEC member should produce. The members do this to try to control the oil price. When an organization or group of companies tries to fix prices in this way it is called a cartel.

Nowadays, OPEC members produce (or pump) around one-third of all the oil used in the world. The two biggest oil producers are Saudi Arabia and Russia. Saudi Arabia is a member of OPEC, but Russia is not. If more oil is pumped than the world needs, there is a surplus, or glut. If this happens the price of a barrel goes down. When less oil

OPEC MEMBER COUNTRIES

| | |
|-----------|----------------|
| Algeria | Libya |
| Angola | Nigeria |
| Ecuador | Qatar |
| Indonesia | Saudi Arabia |
| Iran | United Arab |
| Iraq | Emirates (UAE) |
| Kuwait | Venezuela |

is produced than needed there is a shortage and the price goes up.

Traditionally, OPEC member countries try not to create a worldwide oil surplus. They also want to avoid a shortage. This is because they don't want oil to be too expensive. When this happens companies and people reduce the amount that they use. OPEC uses **quotas** to try to make the correct amount. Each member country agrees to how much it will pump. OPEC then hopes that the total figure will not create an oil shortage or surplus.

Two years ago the price of oil reached \$118 per barrel. It has now fallen below \$40. There are several reasons for this. The economies of countries like China are no longer growing so quickly. They are therefore using less oil. The U.S. is a big oil user. It used to buy much of its oil from OPEC countries. However, in recent years, it has been producing its own oil. It does this by getting oil out of shale rocks deep underground. The process is called "fracking". This word comes from how the rocks are fractured, or cracked.

Several years ago, OPEC countries agreed to pump a total of 30 million barrels of oil a day. Yet many have been producing more than their quota. Total OPEC daily output is now 31.5 million barrels. This is helping to produce an oil glut.

The low oil price is a big problem for less wealthy OPEC members like Venezuela and Nigeria. At the recent OPEC meeting, they wanted members to reduce the amount of oil they pump. However, Saudi Arabia, which is the most powerful OPEC country, refused. The limit was left at 30 million barrels.

The low oil price means that many fracking companies in the U.S. may have to close. Some oil experts believe that Saudi Arabia wants this to happen. If so, it might explain why the country does not want to reduce the amount of oil it produces. **□**

ETNA ERUPTS

Mount Etna is the highest volcano in Europe. It is also one of the world's most active. The volcano is on the island of Sicily, which is a part of Italy. Mount Etna rises above Catania, the second largest city on the island. The volcano has frequent smaller eruptions. One of its larger ones occurred on December 3. Red-hot lava was thrown 3,300 feet (one kilometer) into the air.



Mount Etna eruption

Mount Etna is 10,922 feet (3,329 meters) high. The island of Sicily is home to five million people. Around 25% live close to Etna. The volcanic soils in this part of the island are very **fertile**. Many vineyards and orchards

grow on the volcano's lower slopes and surrounding plains.

The outer layer of the Earth is known as the "crust". It is made up of huge pieces called tectonic plates. Usually called plates, they float on the mantle deep below. The mantle is a layer of hot rock. In places it is like a very thick liquid. The edge of one plate can slide over or under another. The edges can also move apart or push into each other. These plates move very slowly, at about 2.3 inches (59 millimeters) each year. (A human fingernail grows at roughly the same speed.) As they move pressure builds. When it becomes too great the edges of the plates can suddenly move. This is what causes earthquakes and earth tremors.



Satellite view of Sicily with Mount Etna eruption (NASA)

Volcanoes can form at plate boundaries. These are places where tectonic plates meet. Sicily is near a plate boundary. Here, the African plate is being forced under the Eurasian Plate. There are several other volcanoes not far from Mount Etna. These include Stromboli and Mount Vesuvius. Both are in Italy. Stromboli is an island volcano. Mount Vesuvius is best known for what happened in 79 CE. Then, a large eruption buried the Roman city of Pompeii under a thick layer of ash and a type of volcanic rock called pumice.

Volcanologists, or scientists who study volcanoes, believe that Mount Etna has been growing for about

500,000 years. A Greek historian wrote the first known description of a Mount Etna eruption over 2,000 years ago. Two of the biggest recorded eruptions were in 1030 and 1669. In 1030 a 6.2 mile (ten-kilometer) long lava flow reached the sea. The very hot liquid or semi-liquid rock inside a volcano is called magma. When this reaches the surface it is known as lava. Lava that flows on flatter areas of land usually moves very slowly. In 1669 a lava flow reached the city walls of Catania. It arrived five weeks after the main eruption.

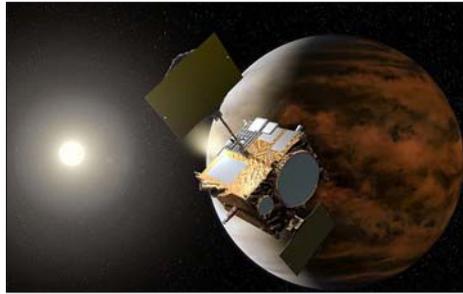
There are five large craters near the summit, or top, of Mount Etna. The volcano has hundreds of much smaller craters on its sides, or flanks. These are called vents. Mount Etna's most **spectacular** eruptions occur at its summit. The recent eruption took place in what's known as the Voragine crater. This is at the top. The eruption covered some villages in a thin layer of ash. Over the following days the ash cloud, or plume, reached a height of 23,000 feet (seven kilometers). ■

AKATSUKI AND VENUS

On December 7, a Japanese unmanned spacecraft, or space probe, began orbiting the planet Venus. Called *Akatsuki*, it was designed and built by the Japan Aerospace Exploration Agency (JAXA). *Akatsuki* is the Japanese word for “daybreak” or “dawn”.

The spacecraft was sent into space on top of a powerful rocket in May 2010. The journey to Venus was supposed to take six months. Unfortunately, the operation to put the space probe in an orbit around Venus five years ago failed. Its main engine shut down after a few

minutes. This meant that *Akatsuki* was not “captured” by Venus' gravity. The probe flew past the planet and continued to circle the Sun.



Artist's impression of Akatsuki spacecraft (JAXA)

Space scientists at JAXA put the spacecraft into **hibernation**. Most of its systems were switched off. They then worked out a plan to get the probe to circle Venus by using its less powerful engines, or thrusters. These engines are normally turned on for a short time to adjust the spacecraft's altitude. The spacecraft had to wait five years for Venus to be close enough to try again. Because of the less powerful engines, the scientists needed to make the probe lighter. They decided to dump a lot of its fuel, or propellant.

Venus is the second-closest planet to the Sun. It is named after the Roman goddess of beauty and love. Venus is one of the Solar System's four rocky planets. The others are Mercury, the Earth and Mars. The four other planets in the Solar System are much bigger. They are made mostly of gases. Jupiter, Saturn, Uranus, and Neptune are often called “gas giants”.

Venus is roughly the same size as the Earth. For this reason it is often described as the Earth's “twin” or “sister”. Unlike many other planets, Venus has no moons. From the Earth, it is one of the brightest objects in the night sky. This is because light from the Sun reflects off the planet's cloudy atmosphere.

Over 95% of Venus' atmosphere is carbon dioxide. It also has sulfur dioxide clouds.

Even though Mercury is closer to the Sun, Venus is the hottest planet in the Solar System. Compared to the Earth, Venus is 25.5 million miles (41 million kilometers) closer to the Sun. Its dense atmosphere of carbon dioxide traps heat. Surface temperatures on Venus are around 842°F (450°C). Spacecraft circling Mercury, the Earth and Mars, can see down to the ground. Yet thick clouds cover Venus all the time. It is therefore the only rocky planet whose surface cannot be seen in normal light.



2010 Akatsuki spacecraft launch (Narita Masahiro)

Winds on Venus are a mystery. They blow all the time at a speed of about 2,235 miles (3,600 kilometers) per hour. This is nearly 60 times as fast as Venus rotates, or spins. Space and weather scientists are unable to explain what causes the winds on Venus or why they blow at this speed. Some of the fastest wind speeds recorded on the Earth are around 248 miles (400 kilometers) per hour.

The spacecraft was designed to study Venus' atmosphere. It has five specially designed cameras. These will use infrared and ultraviolet (UV) light to "look through" the planet's thick clouds. *Akatsuki* should also be able to find out if Venus has thunder and lightning and active volcanoes.

Akatsuki is now the only spacecraft going around Venus. One called the Venus Express arrived in 2005. Yet it lost contact with its European Space Agency (ESA) controllers last year. JAXA scientists think that their spacecraft has enough fuel to last for another two years. ■

TREASURE SHIP FOUND

Juan Manuel Santos is the president of Colombia. On the December 5, he made a surprising announcement. Mr. Santos said that the wreck of the *San José* had been found. This Spanish galleon, or old wooden sailing ship, sank off the coast of Colombia just over 300 years ago.



Painting by Samuel Scott (1702 – 1772) of the *San José* exploding during Wager's Action in 1708

The *San José* (Saint Joseph) was about to sail across the Atlantic Ocean to Spain with several other ships. It was carrying millions of gold and silver coins as well as valuable jewels such as emeralds, diamonds and pearls. Experts think that the ship's cargo is worth at least \$1 billion. Mr. Santos claimed that it was "the most

valuable treasure that has been found in the history of humanity".

The *San José* was sunk during a short sea battle with four British warships in 1708. This naval battle is known as Wager's Action. An admiral called Charles Wager led the British ships. The sea battle took place during the War of the Spanish Succession (1701 – 1714). In 1700 the king of Spain, Charles the Second, died. He did not have any children, or heirs. The kings of France and Austria then both claimed that they had a right to the Spanish throne. This argument led to a war in which many European countries became involved. These included: France, Spain, Portugal, Britain, Austria, the Netherlands, and Prussia (now part of northern Germany and Poland). On one side was France, together with the people in Spain who supported the French king. The other side was an alliance of Portugal, Austria, Britain, Prussia and those in Spain who disliked the French king.

By the time the war began, several European countries had set up colonies in what was then called the "New World". Today, we know the New World as North and South America as well as the islands of the Caribbean, or West Indies. The war's largest battles were in Europe. Yet some fighting also took place in North and South America as well as the West Indies. It's thought that around one million people were killed in this conflict.

Spain controlled most of South America. This included the area that is now Colombia. In the Andes Mountains, slaves were forced to work in gold and silver mines. Most of these precious metals were then sent back to Spain. The *San José* was one of three warships that would

sail across the Atlantic. Two carried large amounts of gold, silver and jewels. These would be used to pay for, or fund, the war in Europe. Wager knew that the Spanish ships were carrying a large amount of treasure. He planned to capture them.



President of Colombia, Juan Manuel Santos

During the battle the *San José* suddenly exploded and sank. There were 600 people on board. Only a few survived. The other ship carrying gold and silver managed to escape. It sailed into the nearby port city of Cartagena. The only ship that the British managed to capture had the least amount of treasure on board.

Mr. Santos said that a team from the Colombian navy had found the *San José*. A remotely operated underwater vehicle (ROV) took pictures of the wreck. These show bronze cannons, weapons and [ceramics](#). It's known that these cannons were specially made for the *San José*. The wreck is 700 feet (213 meters) below the surface. Mr. Santos says that all the items found on the seabed would be displayed in a new museum. This will be built in Cartagena.

Some people suspect that there will be legal arguments about the discovery of the *San José*. One undersea treasure hunting company in the U.S. says that it worked out where the wreck was in 1981. The government of Spain may also claim that it owns any treasure found in the wreck. ■

CHAN ZUCKERBERG PLEDGE

Mark Zuckerberg and his wife, Dr. Priscilla Chan, announced the birth of their baby daughter on December 1. They have named her Max. She is the couple's first child. Mr. Zuckerberg is the cofounder and boss of the Facebook Company.

On the same day, Mr. Zuckerberg and his wife posted an open letter on Facebook. It was addressed to their newborn daughter. The letter says that they hope that Max will have a healthy and happy life. It also included a pledge, or promise. Mr. Zuckerberg said that he and his wife planned to give away 99% of their Facebook company shares during their lifetimes. Currently, these shares are worth around \$45 billion. The couple declared that the money would be used to make the world a

better place for their daughter and all other children.

Mr. Zuckerberg and several other students set up Facebook when they were at university in 2004. Dr. Chan studied at the same university. She is a pediatrician, or doctor who treats children.

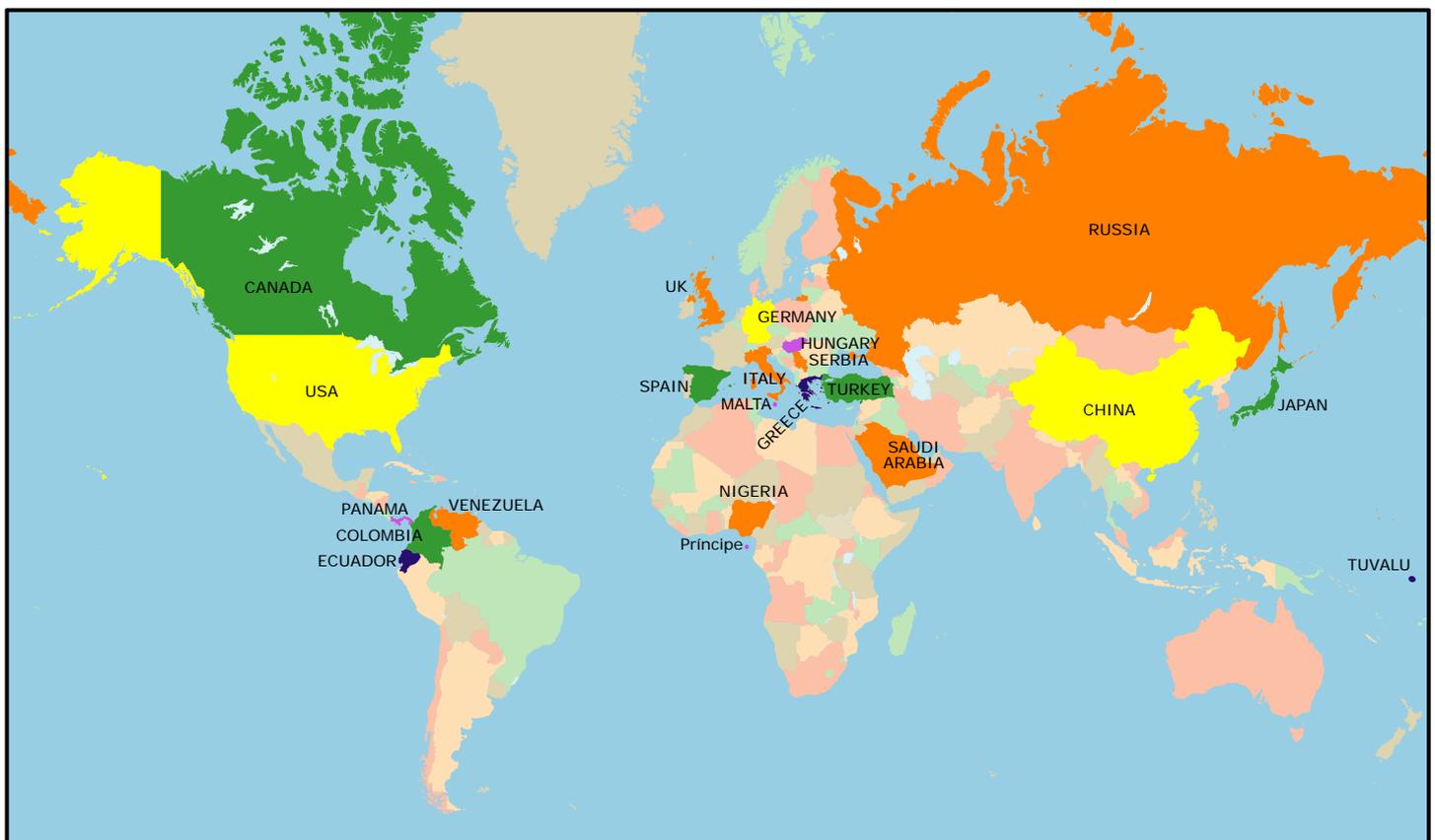
Facebook has become the world's best-known social networking website. It has nearly 1.2 billion users. People register to use Facebook. After this they can set up their own profile and add other Facebook users as friends. Messages can be exchanged. Users can also set up or join other groups. It is one of the world's most visited websites. Facebook makes most of its money from companies and organizations that advertize on its web pages.

Three years ago Facebook held an initial public offering (IPO). This meant that the company's shares

(or stocks) were sold to the public for the first time. Not all the shares in Facebook were sold in the IPO. The total amount of money raised from the share sale was about \$16 billion.

Companies sell shares to raise money. This money is normally used to grow the business or take over other companies. Share prices are listed on a stock market, or stock exchange. Other companies and individuals can buy and sell (or trade) shares listed on stock markets. These share prices often change daily. This can depend on how many people want to buy or sell them. Today, each Facebook share is worth around \$105. The value of the whole company is about \$300 billion.

Wealthy people who give away money for good causes are known as philanthropists. Bill Gates and



his wife, Melinda, set up a charitable organization or [foundation](#) 15 years ago. Mr. Gates was a cofounder of the Microsoft Company. Currently, he is the richest person in the world. The Bill and Melinda Gates Foundation gives large amounts of money to help find cures for diseases such as malaria and HIV/AIDS. It also helps to reduce poverty and provide computer-related education.



Priscilla Chan and Mark Zuckerberg (Facebook)

Mr. Zuckerberg and Dr. Chan have set up a company called the Chan Zuckerberg [Initiative](#) (CZI). They plan to put \$3 billion into the company over the next three years. The Bill and Melinda Gates Foundation is a charity. This means it is a “nonprofit” organization. It does not make any money. The CZI is different. As it is a company, the CZI can set up new companies, invest money in others and make a profit. Mr. Zuckerberg and Dr. Chan say that the CZI will use the money in ways that “promote equality in health, education, scientific research, and energy”. ■

ETRUSCAN TOMB

A farmer was working in his fields with a [plow](#) near Perugia. This city is in central Italy. Suddenly a void, or hole, opened in the ground underneath him. Later, archaeologists confirmed that it was a 2,500-year-

old Etruscan tomb. It had not been opened before. Finding an intact Etruscan tomb, or one that grave robbers had not broken into thousands of years ago, is a rare event.

Not much is known about the Etruscans. Their civilization was centered on the western side of central Italy. The area in which they lived was known as Etruria. In modern-day Italy, this includes the region of Tuscany as well as western Umbria and northern Lazio. Many well-known places in Tuscany, such as Florence, Pisa, and Siena, all began as Etruscan cities or towns. The Tuscany name comes from the Latin word “*Tuscas*”. This means an Etruscan, or person from Etruria.

This Etruscan civilization is believed to have begun around 800 BCE. It was at its height, or most powerful, about 300 years later. This means that the Etruscans were an important civilization at the same time as the Ancient Greeks. The Etruscans and the Greeks traded with each other. However, by 264 BCE most of Etruria had been taken over by the Romans.

The Etruscans left no written texts and little is known about the language they spoke. Most descriptions of their culture are from early Roman writings. Scholars have discovered information about their religion from items found in graves and tombs. The Etruscans believed in the afterlife. Many of their tombs were decorated with wall paintings.

The Etruscans’ religion was polytheistic. This means that the people worshiped many gods. They even adopted several gods from Ancient Greece and Rome. The goddesses Artemis and Minerva are examples. Artemis was the Greek goddess of hunting, forests, the Moon, and archery. Minerva

was the Roman goddess of wisdom, poetry and medicine. A sky god called Tina seems to have been one of the most important Etruscan deities.

No one knows where the Etruscans came from. Some historians believe that they were local farmers who already lived in central Italy. Yet Herodotus, the famous Greek historian, tells a different story. He lived around 450 BCE. Herodotus says that the Etruscans came from Lydia. Today, this is the western part of Turkey.

The Ancient Greek historian describes a bad famine in Lydia. There was not enough food for everyone. The king divided his people into two groups. The leaders of each group drew lots. The group that lost was told to leave. They sailed to Italy and became the Etruscans. In recent years, genetic tests have been done. These suggest that the Etruscans could have come from western Turkey. So there may be some truth in Herodotus’ story.



One of the marble coffins in the Etruscan tomb (Soprintendenza Archeologia Dell’Umbria)

The recently discovered tomb has a corridor. It leads to a double stone door. On the other side is a rectangular chamber. It contains two marble or stone coffins. There are many other items in the chamber. These include: urns, jars, pottery, vases, and a broken marble head. One coffin has been marked with what looks like a name. The inscription says “Lars”. The plaster

on top of the other coffin has been damaged. This happened when part of the roof collapsed a long time ago.

All of the items found in the tomb will now be recorded. After this has been done they will be displayed in a local museum. ■

BANANA DISEASE

The most popular banana used to be a type called Gros Michel. It was nicknamed “Big Mike”. Most bananas sold in shops were Gros Michels. It was the only banana that could be transported for long distances. In the 1950s a disease killed nearly all the Gros Michael plants. The disease is a type of fungus that lives in the soil. As it was first seen in Panama, it became known as Panama Disease.



Cavendish bananas (www.stevehopson.com)

The Gros Michel was replaced by another banana called the Cavendish. Then, the disease did not seem to affect these bananas. Today, of all the bananas sold in the world, 99% are Cavendish.

Scientists have completed a study on a fungus that is killing Cavendish bananas in several parts of the world. Recently, they announced their results. The scientists confirmed that it is a new type, or strain, of Panama Disease. Many people now fear that what happened to Gros Michels could happen to Cavendish bananas.

Bananas are the world’s most popular fruit. They are grown in

around 150 countries. The banana plant is a herb and not a tree. (At around 49 feet (15 meters), it is the tallest herb in the world.) The plant does not have a wooden trunk like a tree; it is made of overlapping leaves. Bananas grow in tropical regions. These places are hot and have a lot of rainfall. Nearly all the bananas that are exported grow in countries close to the Equator.

It’s thought that bananas originally came from Southeast Asia. Today, many wild bananas grow in the jungles of Malaysia, Indonesia and the Philippines. Traders probably brought the plants to the Middle East and Africa thousands of years ago. The banana’s name comes from the Arabic word for “finger”.

Around 450 years ago Europeans from Portugal, Spain, the Netherlands, and Britain began to set up colonies in North, Central and South America. Here they created plantations to grow crops like coffee, cacao (used to make chocolate) and sugar cane. Men and women were captured in Africa and then sold as slaves to work on these plantations. Banana plants, which produce fruit throughout the year, were grown to feed the slaves.

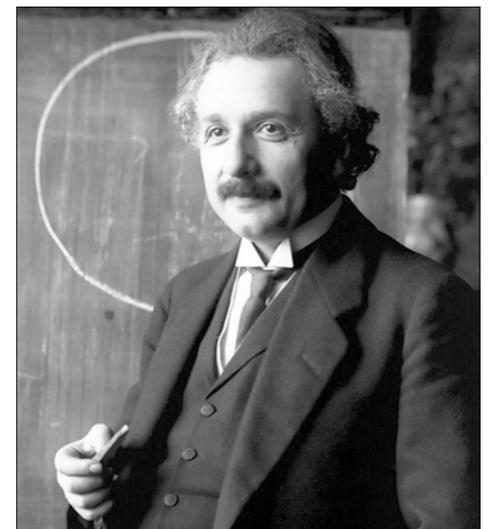
In olden days it was not possible to transport bananas to countries in Europe. This was because sailing ships took many weeks to complete the journey. By the time they arrived, any bananas would have become rotten. It was not until the 1880s that ships were able to take large amounts of bananas from South America and Caribbean islands to Europe and the U.S. These ships were specially designed, so the fruit arrived before it had fully ripened.

The scientists think that the new Panama Disease strain appeared about 50 years ago in Southeast

Asia. In recent years, it has spread to other parts of Asia, Australia, Africa, and the Middle East. Today, most bananas sold in shops come from Latin America. The country that exports the largest amount is Ecuador. The scientists say that the disease will eventually reach Latin America. However, they are not able to predict when this will happen. ■

RELATIVITY ANNIVERSARY

At the end of November 1915, or 100 years ago, a scientist called Albert Einstein presented a theory for the first time. He spoke to the Prussian Academy of Sciences, in Germany. The theory, which is known as general relativity, surprised most scientists. It rewrote the laws of nature. Relativity also changed the way in which light, gravity and time are understood.



Albert Einstein in 1921

Albert Einstein (1879 – 1955) was a German-born scientist. He is often described as a genius and “the father of modern physics”. Einstein’s family were non-observant Jews, so they were not religious. When he was 15, his father and family moved to Italy. Einstein stayed behind to

finish his education at school. Yet, as he was so unhappy, Einstein left before taking his final exams.

Einstein applied to go to a college in Switzerland. He had to take an entrance exam. Einstein failed some subjects. However, as his math results were so good, the college accepted him. At first, he trained to be a science and math teacher. Yet, after leaving college, Einstein was unable to find a teaching job. Instead, he worked as a clerk in a [patent](#) office. Einstein came up with many of his scientific theories while he was doing this job.

Einstein then decided to become a university professor. He gave lectures all over the world. In 1921 he was awarded the Nobel Prize for Physics. Einstein moved to the U.S. in 1933. A few years later he became an American citizen.

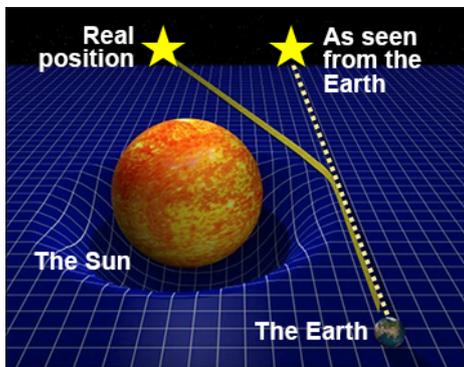


Diagram showing how the Sun, or large space object, can bend light rays from a distant star

Einstein is best known for his equation $E = mc^2$. This is probably the “world’s most famous equation”. It links energy (E) to the mass of an object (m) and the speed of light, in a [vacuum](#), (c). Einstein’s general theory of relativity says that mass can warp, or bend, both space and time. Time passes more slowly when gravity is very strong and rays of light can bend.

When Einstein first presented his work it was all equations and

theories. So unlike other scientific works, Einstein was not able to set up experiments that proved his theories. In 1919 a British scientist called Arthur Eddington (1882 – 1944) thought of a way to do this.

Eddington travelled to the island of Principe off the west coast of Africa. He knew that he would be able to see a total solar eclipse from the island on May 29, 1919. Eddington wanted to observe and take measurements of stars that appear close to the Sun. This can only be done during a solar eclipse. The Sun is so bright that normally it blocks out the light from stars in the same area of the sky.

A few months before traveling to Principe, Eddington made some calculations. He worked out which stars should be exactly behind the Sun during the solar eclipse on the Island. If they were behind the Sun, he should not be able to see them. His measurements proved that the stars could be seen. As they were visible, the Sun’s gravity must have been bending the light coming from them. This showed that starlight could be bent by a very large object’s gravity. This was exactly what Einstein had predicted.

Einstein waited for the results of Eddington’s measurements. The British scientist sent him a telegram. It told Einstein that his theory was correct. Newspapers then reported that the theory of general relativity was right. The news reports made Einstein world famous. ■

CHACO CANYON BUILDINGS

Chaco Canyon is in the state of New Mexico, in the U.S. The canyon is ten miles (16 kilometers) long. It contains the ruins of several large

buildings. The ancient Puebloan people constructed them. The buildings, known as “large houses”, were made from stone and wood timbers. Yet no trees grow in this part of New Mexico. For many years people wondered where these timbers came from. Now, a team of scientists has found out.

The Puebloan people began building in Chaco Canyon around the year 850. This work continued for 300 years. Then, in about 1150 the great houses were abandoned. It is not known why. Some think that everyone left because of a drought, or lack of rain.



The ruins of one of Chaco Canyon’s great houses in New Mexico (National Park Service)

How the Puebloan people learned to construct the large buildings is another mystery. There were 12 great houses. Some were four or five stories high with 700 rooms. They also had many circular structures. Called kivas, no one is sure what they are. Some think that kivas were used for storing food crops, or grain. Others believe that they had something to do with religious ceremonies or water. Some windows and doors in the great houses seem to line up with the Sun and stars at certain times of the year.

Roads and pathways connected all the great houses. How many people lived in the houses is unclear. They are the largest pre-Columbian buildings in North America.

Europeans first arrived in North, Central and South America just over 500 years ago. In the Americas, the time before this date is known as the pre-Columbian period. This name comes from Christopher Columbus (1451 – 1506). Columbus may have been the first European to sail across the Atlantic Ocean. He landed on several Caribbean islands in 1492.



Ancient wooden beams in the wall of one of Chaco Canyon's great houses

When people first began to study the buildings in Chaco Canyon, they thought that the wood came from the surrounding area. No trees grow in this area today. They suspected that the Puebloans had cut them all down. This, they believed, could have helped to change local weather patterns and create a drought. Nowadays, most people think this explanation is unlikely.

The scientists set out to discover where all the wooden timbers came from. Many of these were used to strengthen the buildings and create floors and roofs. The floors and roofs have now gone, but some timbers can be seen sticking out of walls.

The scientists matched the tree rings of the timbers with trees that grow far away. Tree rings are also known as growth rings. They can be seen in the trunk of a tree after it has been cut down. The rings form **concentric** circles. Each ring, or circle, represents one year's growth of the

tree. By counting the rings it is possible to calculate a tree's age. The rings' width shows how much the tree grew in that year.

By matching the rings, the scientists are sure that the wood used to build the great houses came from two forests. One is to the west and the other to the south. Both are about 50 miles (80 kilometers) away. Experts believe that 240,000 trees were used to build the great houses in Chaco Canyon. Amazingly the Puebloan people had no metal tools. What's more, they did not use wheels and didn't have animals that could carry or pull heavy weights. ■

OSCE MEETING

The OSCE's Ministerial Council met in Belgrade, the capital of Serbia, on December 3 and 4. These OSCE meetings take place every year. OSCE stands for the Organization for Security and Co-operation in Europe. The organization was formed in 1973. Then, its official name was the CSCE (Conference on Security and Co-operation in Europe).



NATO (North Atlantic Treaty Organization) is an alliance. It was set up by the U.S. in 1949. The alliance began with seven nations. Now, 28 countries are NATO members. Apart from the U.S., Canada and Turkey, all are European countries.

NATO was formed soon after the Cold War began. This was not a real war. The name is often used to describe the period between 1947 and 1991. Then, the Russian-led Soviet

Union and the U.S. (together with its allies in Western Europe) were enemies. Many feared that a nuclear war could break out between the Soviet Union and the U.S. During the Cold War, Europe was divided. Most European countries were either NATO members or controlled by the Soviet Union.



OSCE country flags

At first, the CSCE's job was to provide opportunities for talks between NATO members and countries controlled by the Soviet Union. The Soviet Union began to break up in 1991. Most countries within it became independent nations. Many former Soviet Union countries in Eastern Europe have now joined NATO. These include: Bulgaria, Estonia, Hungary, and Poland. In 1995 the CSCE officially changed its name to the OSCE.

Today, the OSCE's headquarters is in Vienna, the capital of Austria. The organization has 56 member countries. These are mainly in Europe, Central Asia and around the Caucasus Mountains. The U.S. and Canada are also members. Nowadays, the OSCE's main job is checking on weapons, human rights, press freedoms, and elections within its member countries. For example, the OSCE frequently sends monitors to countries holding elections. The monitors are supposed to check whether the elections are free and fair.

The OSCE also tries to bring an end to regional conflicts and wars.

For the last two years, the OSCE has been working in eastern Ukraine. There, armed groups, known as rebels, have been fighting against Ukrainian government forces. The rebels want several regions in this part of Ukraine to be self-governing. Russia has been supporting the rebels. The two sides agreed to a ceasefire about ten months ago. OSCE monitors have been trying to make sure that this ceasefire is not broken.

Normally, the foreign ministers of OSCE countries attend its Ministerial Council. Member countries take turns to help to run the OSCE. For the last 12 months this job has been done by Serbia. This is why the meeting was held in Belgrade. Germany will take over at the beginning of 2016.

PERSON OF THE YEAR

Germany's chancellor, Angela Merkel, has been chosen as *Time* magazine's "Person of the Year" for 2015.

Time is a well-known American news magazine. It began selecting its "Person of the Year" in 1927. (At first, it was called the "Man of the Year". This changed to "Person of the Year" in 1999.) Charles Lindbergh was the magazine's first "Man of the Year". He was a pilot. In 1927 Lindbergh flew a plane across the Atlantic Ocean. No one had done this before. Lindbergh took off from New York, in the U.S., and landed in Paris, the capital of France.

The magazine says that the "Person of the Year" is not meant to be a prize or honor. In the past, it has selected people who have become mass murderers. Both Adolf Hitler, who led Nazi Germany, and Joseph Stalin, a former leader of the Russian-led Soviet Union, have been

"Man of the Year". Stalin was chosen twice. Winston Churchill, a former UK prime minister and wartime leader, was another two-time "Man of the Year". Other "doubles" are four American presidents: Franklin D. Roosevelt, Richard Nixon, George W. Bush, and Barack Obama.



Time's December 2015 cover

Time's Person of the Year is not always a single person, or even a person at all. For example, in 1983 the personal computer was chosen. Twelve months ago, the Person of the Year was the "Ebola Fighters". Then, there was a serious outbreak of the Ebola disease in West Africa. This disease can be passed from one person to another easily. Many people who get it die. *Time* explained that the "Ebola Fighters" were all the people who worked with Ebola patients in West Africa. They included doctors, nurses, ambulance drivers, and the graveyard workers who buried the dead.

Angela Merkel has been Germany's leader since 2005. She studied physics at university. Later, she worked as a chemist in East Germany. She married Ulrich Merkel, a physics student, and took his

name. They divorced in 1982. Mrs. Merkel married her second husband, Joachim Sauer, in 1988. He is a professor. The couple do not have any children.

In her younger years, Mrs. Merkel had no interest in politics. The Berlin Wall came down in 1989. The following year East and West Germany were reunited as one country. Mrs. Merkel joined a political party two months before this happened. By 2000 she had become its leader.

Mrs. Merkel is only the fourth "individual" woman to be named *Time's* Person of the Year. The first was Wallis Simpson in 1936. In that year, Edward the Eighth, the king of the United Kingdom (UK), gave up the throne to be with Ms. Simpson. She was an American who had been married twice before. Queen Elizabeth the Second of Britain was *Time's* choice in 1952. The other woman was Corazon Aquino in 1986. Then, she was the president of the Philippines. Over the years, *Time* has selected several groups that have included women to be its Person of the Year.

In 1999 Albert Einstein, the famous scientist, was selected as *Time* magazine's "Person of the Century". ■

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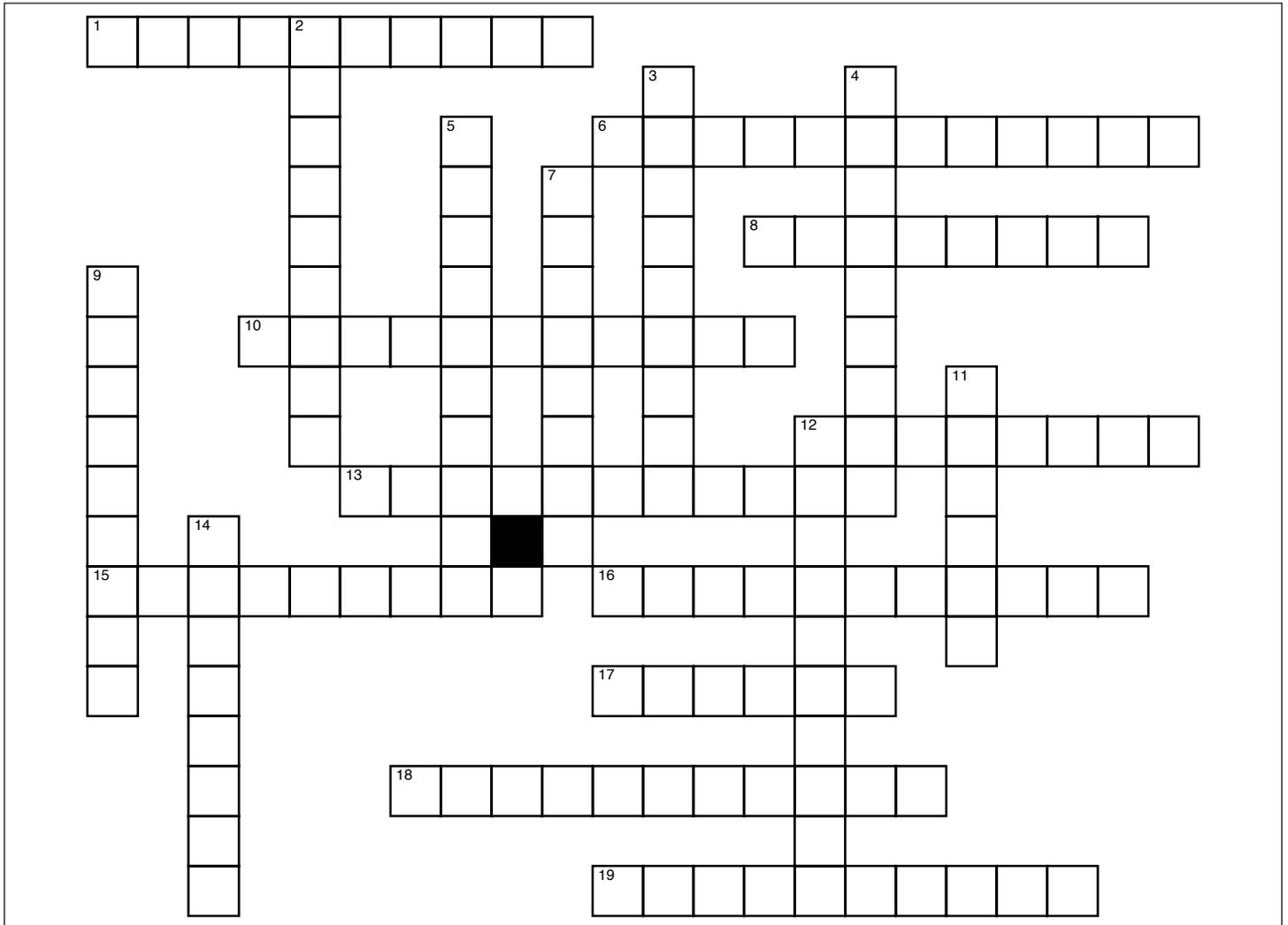
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GLOSSARY PUZZLE

INSTRUCTIONS: ① Complete the crossword. The answers are highlighted in orange in the news stories. There are 25 words highlighted and you need 20 of them to complete the crossword. ② Once you have solved the crossword go to the word search on the next page ➡



Across

- 1 Noun** An organisation set up to help others, supported by gifts of money
6 Adjective Belonging to the present time
8 Verb To scatter
10 Noun Deep sleep-like state that lasts for a long time
12 Adjective Having a very bad reputation
13 Noun Plural Notes added to written texts or music scores that are brief explanations or opinions
15 Noun Plural People who look after sheep and keep them together
16 Adjective Describes something that is impressive, grand, or dramatic
17 Noun Plural Numbers or quantities of something that are officially allowed
18 Noun Living forever or never dying
19 Adjective Describes circles and rings that have the same center

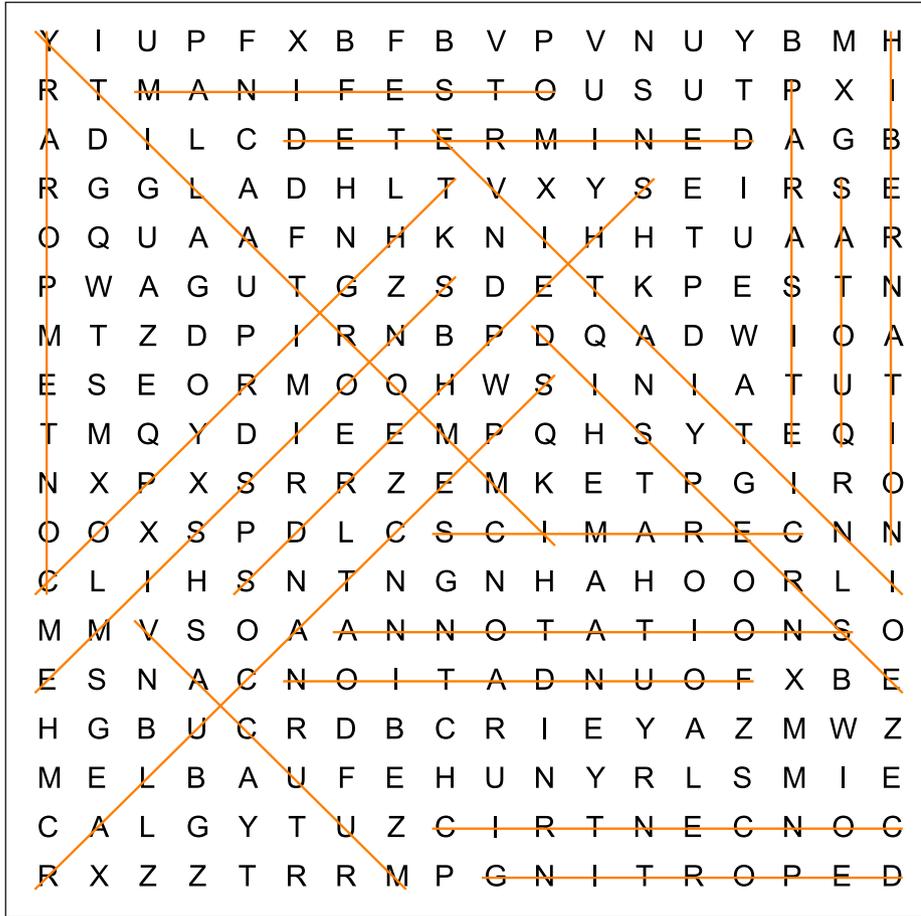
Down

- 2 Verb** Sending a person away from a country or region by force
3 Noun Legal right to control the production and sales of a book, play, film, photograph or piece of music
4 Noun Plural Gases, especially carbon dioxide and methane, which, when added to the Earth's atmosphere may contribute to higher temperatures and climate change
5 Adjective Strongly want, or a desire, to succeed
7 Noun An animal, plant or microorganism living in, or on, another from which it gets its nourishment
9 Noun A declaration of what a person or government intends to do if elected
11 Noun A space from which the air has been completely removed
12 Noun The power or will to get something started or to be the first to set something up
14 Noun Plural Pottery objects, often bowls, tiles or figures

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GLOSSARY PUZZLE *CONTINUED*

INSTRUCTIONS: ③ Find 19 of the 20 crossword answers in the word search. Words can go vertically, horizontally, diagonally and back to front. ④ After finding the 19 words write down the 20th (or missing) word under the puzzle.



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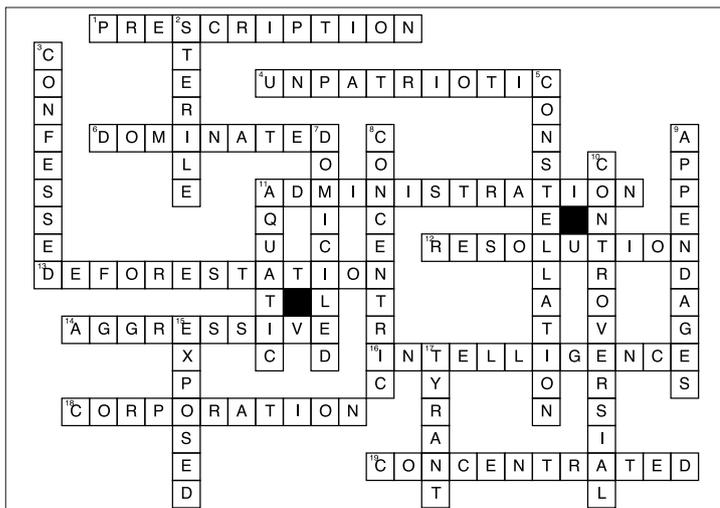


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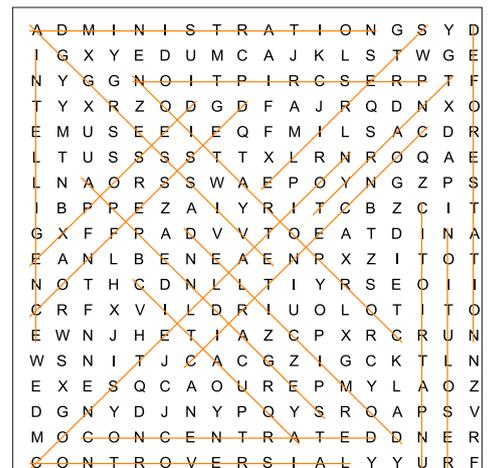
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If you wish to earn additional Demics please email the missing word answer to: subscriptions@newsademic.com Puzzle entries need to be submitted by 10pm on 23rd December 2015 (GMT/UTC).*

MISSING WORD ANSWER =



ISSUE 263 ANSWERS



D O M I N A T E D