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Planetarium Science Center
Science For All!

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In this edition...

Planet Earth: The Cradle of Life

By: Maissa Azab

"Viewed from the distance of the Moon, the astonishing thing about Earth is that it is alive. Photographs show the dry, pounded surface of the moon in the foreground, dead as an old bone. Aloft, floating free beneath the moist, gleaming membrane of bright blue sky is the rising Earth, the only exuberant thing in this part of the cosmos. If you could look long enough, you would see the swirling of the great drifts of white cloud, covering and uncovering the half-hidden masses of land. If you had been looking for a very long, geologic time, you would have seen the continents themselves in motion, drifting apart on their crustal plates, held afloat by the fire beneath."*

This vibrant quote I have stumbled upon by accident while researching this issue's overarching theme, Planet Earth, touches on several riveting aspects we are tackling here. Naturally, with such a broad and spectacular theme, we could only select a handful of angles; we have thus chosen those most relevant to our lives in this day in time, and especially this explosive year full of riveting natural and human events.

In this issue, you will find features about the eruptive nature of Earth, its temperamental weather, in addition to its vulnerability to the ever-surprising space weather. We also discuss the blossoming of biodiversity on the planet, the ongoing adventure that is the search of human history, and we fantasize about taking a one-day trip around this marvelous world. Closer to home, we tackle alarming environmental issues threatening our region, and the current explosion of political debate on the local front.

*The opening quote is attributed to Lewis Thomas (1913-1993); physician, author, educator and researcher. Thomas served as Dean of Yale Medical School and Dean of the New York University School of Medicine.

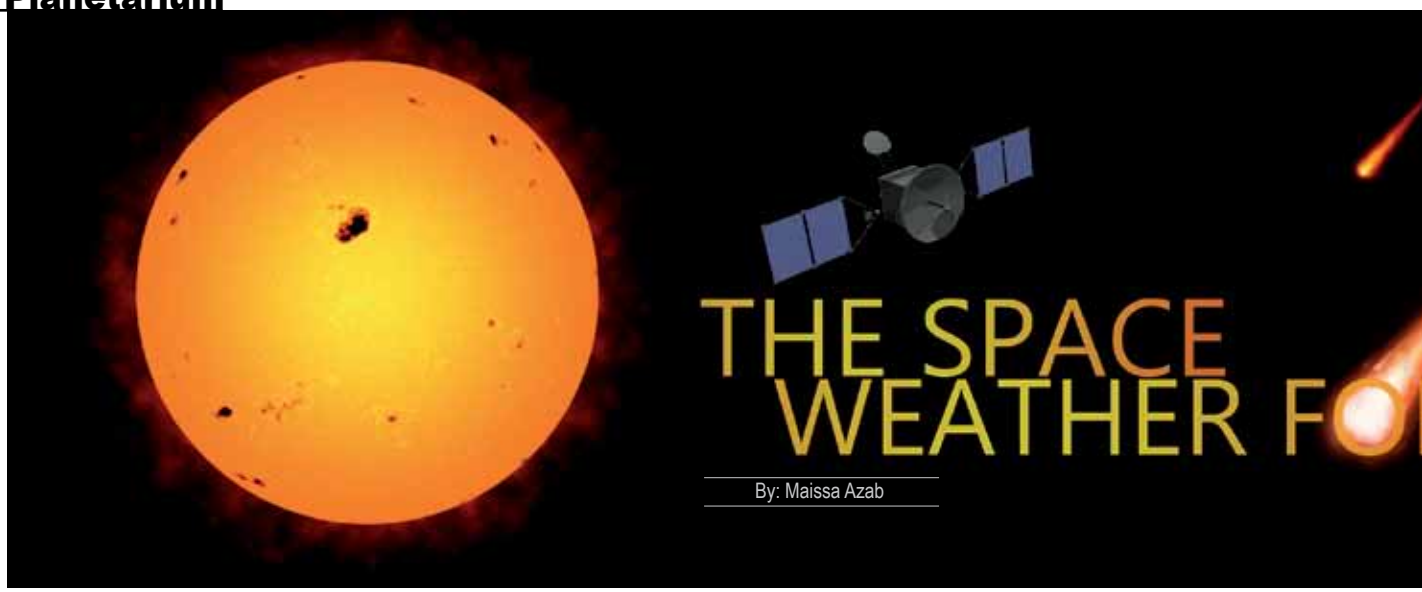
Our view of Earth has dramatically changed by images from space. The defining moment occurred in December 1968 during the Apollo 8 mission; the first manned mission to circle the Moon. As William (Bill) Anders approached a window to photograph the Moon, he was bewildered. What he saw and instantly captured was a unique view of the Earth above the lunar horizon. I consider this "Earthrise" view the picture of the past century. It showed our life-giving planet with its serene colors floating in the bleakness of space. The impact of that awesome view on the human mind initiated the environmental movement worldwide.

Today, numerous sensors onboard satellites belonging to many nations constantly capture and beam images of the Earth. They survey ocean waters; measuring their temperature, salinity and current directions. Some depict cloud patterns, estimate the amount of rainfall, and monitor variations in the ozone hole. Others focus on landforms to depict faults along which movements cause earthquakes, or reveal regions of flash floods and over-flowing rivers.

Such views are unique and provide crisp understanding of regional patterns, as well as detailed characteristics. That is why developed countries continue to allocate funds for imaging satellites. The reason is applicability to development planning. Depiction of surface and subsurface features at various scales allows for better utilization of material resources. Revealing sand-buried courses of rivers and streams beneath desert sands is a case in point. These channels terminate at depressions where the water formed lakes and seeped into the substrate as groundwater. Potential applications in Arab deserts, particularly in Egypt, have enormous benefits to economic development.

Repeat coverage of the same areas allows monitoring of change. Two images separated by a number of years can be overlain to depict the nature and extent of change. This process has been successfully applied in Egypt to monitor urban encroachment on the fertile land of the Nile River and Delta. During the past 20 years, Egypt lost 30,000 feddans of agricultural land per year to urban growth. If this continues unabated, the fertile land of Egypt would disappear under cement in 183 years. Thus, efforts are being implemented to halt the process.

As we look forward to a future Egypt that is free, visionary, energetic and environmentally sound, I foresee more use of the space data in development plans. These should include opening new land for living with opportunities for its youth to excel and innovate. It is because of this reason that I salute the Planetarium Science Center of the Library of Alexandria for initiating this Newsletter, which should encourage young Egyptians to learn more about science. Such knowledge is essential for developing the country's resources and preserving the environment for the benefit of future generations.



THE SPACE WEATHER F

By: Maissa Azab

Although space weather forecasts are not normally featured on the evening news, space weather does impact life on Earth in many ways. Our modern, technologically complex systems—communications, transportation, and electrical power systems—can be disrupted and damaged by space weather storms. Exposure to radiation can threaten astronauts and air travelers alike, and has affected the evolution of life on Earth. Space weather probably also alters the weather and climate on our planet, though we do not have a precise understanding of those influences yet.

When we describe weather on Earth, we talk about several interrelated factors; such as temperature, wind speed and direction, humidity, precipitation, barometric pressure, and so on. Similarly, when we speak of space weather there are several key values that we mention; such as solar wind speed, particle density of electrons and protons, the strength and orientation of the Interplanetary Magnetic Field (IMF), etc.

Weather on Earth varies from place to place and over time; the same is true for space weather. Space weather might be "stormy" in the vicinity of Mars, while it is calm in the neighborhood of Jupiter. Changes in weather, both Earth and space varieties, take place over a wide range of time scales; some changes happen within minutes or hours, others take days or weeks, and some span periods of years or longer.

The Earth's magnetosphere[1] keeps most of space weather's effects safely out in space. Some radiation does, however, pose a hazard to astronauts and to air travelers at high latitudes near Earth's poles. Energetic particles can damage satellites and shorten their lifespan. Changes in the ionosphere alter long-distance radio signals and Global Position Systems (GPS). Strong magnetic fields can diminish the accuracy of compasses, disrupt magnetic prospecting, and even cause homing pigeons to go astray. The same magnetic fields can induce electrical currents at ground level that can destroy electrical power distribution grids, interrupt telegraphs, and even increase corrosion in pipelines.

Heat and light from the Sun play a dominant role in Earth's weather. It hence seems likely that variations in the Sun should cause changes in Earth's weather and climate. They probably do, but scientists are not yet sure exactly how those connections work. Atypical periods in the Sun's 11-year sunspot cycle seem to correlate with severe cold snaps, though the correlations are imperfect. Solar and space weather variations may influence rates of cloud formation and the freezing of airborne water droplets. The truth is that the Sun's multifaceted influence on Earthly weather continues to be the subject of much research.

The Sun has a complicated and changing magnetic field, which sometimes changes explosively, spitting out clouds of plasma and energetic particles into space and sometimes towards Earth. The solar magnetic field changes on an 11 year cycle, where the number of sunspots, flares and solar storms increases to a peak, which is known as the solar maximum; after a few years of high activity, the Sun ramps down to a few years of low activity, known as the solar minimum.

BLAST FROM THE PAST!

From the 1859 massive solar storm called the Carrington Event viewed all over the world, to a fatal near miss by astronauts during the Apollo missions, to satellite losses and large scale power outages in recent decades, space weather has played a much more important role in society than most people are aware.

In 1859, astronomers were still very unsure of the impact the Sun had on Earth. It was known then that the Sun developed sunspots; what they actually were was a point of debate though. Many astronomers observed sunspots regularly, including 33-year old Richard Carrington.

On the morning of 1 September, Carrington sketched a huge group of sunspots that were projected through his telescope onto the back wall of his observatory. He watched the exceptional group closely. At 11:18 am, he witnessed something he had never seen before; a burst of intense white light. Knowing that this was the first time anyone had ever seen activity like this, he ran to find a witness. Returning 60 seconds later, he found that the bright white light was now almost gone. At 11:23 am, only five minutes later, the light vanished completely and the Sun returned to normal.

That night, about 18 hours later, the entire world lit up with a bright red glow. It was the aurora[2], normally seen over the North and South Poles. The day after Carrington's flare, the geomagnetic display was even more dramatic. Streaks of

white and yellow light were reported to reach up to the zenith[3], while the surrounding sky glowed a crimson color. Magnetic observatories across the world recorded exceptionally strong magnetic fields that caused instruments to jump right off the charts. It was not even possible to measure the full strength of the storm as observatories were not equipped to measure such huge deviations in the Earth's magnetic field.

The two nights prior to the Event, on 28 and 29 August, telegraph systems were thrown into mayhem. The long wires that allowed telegraph operators to transmit messages in the Morse code over long distances became independently electrified; in some offices, large sparks arched from the wire to the walls. On the night of the Event, the mayhem continued; this time, the batteries that normally power the telegraph lines were disconnected and the system was powered entirely by electrical currents in the Earth's atmosphere.

To this date, the Carrington Event remains the largest solar storm to hit the Earth in recorded history. Ice cores show that an event like this happens only once about every 500 years. We now know that certain conditions had to be just right for the Earth to experience a geomagnetic storm of that magnitude.

The gigantic sunspot group that Carrington observed was the source of an extraordinary explosion of energy and solar particles, manifesting as an exceptionally bright flare and Coronal Mass Ejections (CMEs). The Sun ejects CMEs all the time, however, in the case of the Carrington Event, the explosions left the Sun in just the right direction to strike the Earth dead on. These CMEs traveled approximately twice as fast as most CMEs, reaching Earth in less than a day when most CMEs take 2-4 days to travel the 150 million kilometers between the Earth and the Sun. Moreover, the magnetic fields carried along with the CMEs as they traveled through space were in just the right orientation to cancel part of the Earth's protective magnetic field, allowing particles to penetrate deeper into the magnetosphere than normally possible.

The amount of matter carried with the CMEs resulted in such a high number and density of particles striking the Earth that the conditions experienced during the Carrington Event are now adopted as the worst-case scenario conditions considered when designing space missions.

At the time of the Carrington Event, society depended very little on electricity for its infrastructure. Today, almost all communications, transportation, navigation, and business systems depend on electrical power, the internet, and satellites in space. An event like the one in 1859 could wipe out satellites and electricity across the world. It is estimated that damages from such an event could lead to a loss of up to USD 2 trillion in the first year.

No wonder NASA and other space agencies around the world have made the study and prediction of flares a priority. Right now a fleet of spacecraft is monitoring the Sun, gathering data on flares big and small that may eventually reveal what triggers the explosions. Research will not prevent another Carrington flare, but it may make the "flurry of surprise" a thing of the past.

GLOSSARY

(1) The **Magnetoshpere** is the region surrounding a planet where the planet's magnetic field dominates. Because the ions in the solar plasma are charged, they interact with these magnetic fields, and solar wind particles are swept around planetary magnetospheres. Life on Earth has developed under the protection of this magnetosphere.

(2) The **Aurora** is a natural light display in the sky, particularly in high latitudes (Arctic and Antarctic). It is caused by the collision of energetic charged particles with atoms in high altitude atmosphere (thermosphere).

(3) **Zenith** refers to the highest point reached by a celestial body during its apparent orbit around a given point of observation.

AVAILABLE SHOWS

The Zula Patrol
23 Min. Full-dome Show

Stars of the Pharaohs
35 Min. Full-dome Show

Seven Wonders
30 Min. Full-dome Show

Oasis in Space
25 Min. Full-dome Show

Mystery of the Nile
45 Min. IMAX Show

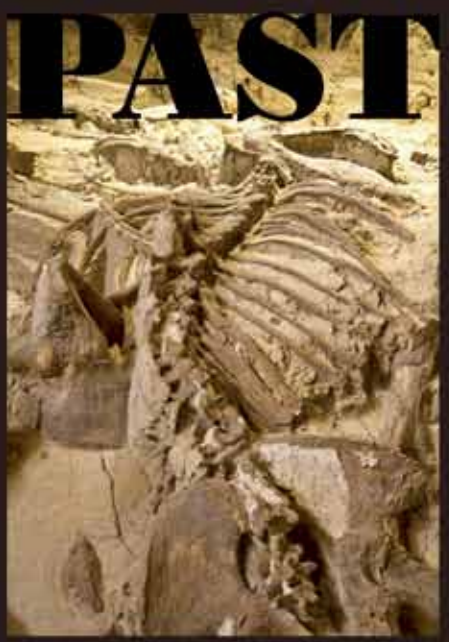
Cosmic Voyage
35 Min. IMAX Show

Stars Show
45 Min. Live Show by the PSC resident astronomer

VISITORS INFO

- For the Planetarium daily schedule and fees, please consult the Center's official website: www.bibalex.org/psc.
- Kindly note that, for technical reasons, the Planetarium maintains the right to cancel or change shows at any time without prior notification.

Unearthing THE PAST



By: Jailane Salem

Have you ever wondered how old the planet we call home is? Some estimate that the Earth is 4.55 billion years old. Humans, however, did not exist for a large part of the Earth's history; the oldest human remains date back only 2.3 million years!

Early humans lived in a world that was extremely different from ours. If we only depended on written records to tell us the story of our ancestors we would be in a bit of a bind, since early writing systems only date back to around 4000 BCE. This would only allow us to know of a very small fraction of our human history; this is where archeology steps in. Archaeology gives us access to the entire spectrum of human history and offers us the possibility to understand and learn from a myriad of cultural processes, such as the rise and fall of civilizations.

For many of us, thinking of archaeology could conjure images of Indiana Jones unearthing long lost treasures. There is, however, much more to archaeology than the thrill of adventure; it is the scientific study of the human past, culture and behavior from the dawn of humanity till now. It is the means whereby we are able to extend our knowledge of human history beyond the limits of written records by examining material remains of previous human societies to piece together people's histories.

Archeology is not limited to the study of prehistoric societies; it encompasses the study of literate cultures as well. The records surviving from civilizations, such as Ancient Egypt and Mesopotamia, may give us biased views of how things were with literacy being only available to the elite classes; the clergy or the bureaucracy of court or temple. Consequently, written records tend to reflect cultural values of a limited number of individuals that do not represent the whole of society. Thus, it is crucial to have other sources to turn to; this is why archeologists study the material record of those cultures in hopes of getting a more balanced view.

Archeologists glimpse a hint of how people lived at different times in history by analyzing material remains that might have no obvious function. These discarded remains would have been seen as unimportant to their owners but not so to archeologists; it is through such items that a wealth of knowledge is discovered about daily life in ancient times, which otherwise we would not have known because they would have been deemed too unimportant to be mentioned in written records.

Archeologists rely upon many scientific fields such as chemistry, biology and geology, to name a few. Through new techniques and modern technology, archeologists can tell the gender, age and height of skeletal remains; DNA tests can also determine aspects of migration, dietary habits and health. A few years back, DNA testing proved that Tutankhamen was not murdered as previously speculated, but most probably died due to health issues. These new and developing technologies are providing exciting opportunities, to historians and archaeologists alike, to revisit the past with a new eye hoping to make new and more accurate findings.

Archaeology, History of

Archeology developed during the 19th century; however, it was preceded by antiquarianism in the 17th and 18th centuries. Early antiquarians tried to analyze ancient sites to figure out their age and functions; they would sometimes even carry out simple excavations. Some of the assumptions antiquarians made were later modified by archeologists; for example, antiquarians believed that weapons and tools made from stone, iron and bronze indicated the social status of their owner, rather than the historic period they belonged to. It was in the 19th century that the three-age system was established; it indicated that different materials used in tool making technologies could represent different time periods and that human prehistory could be divided into the ages of stone, iron and bronze.

Even though the different ages did not always start for all societies at the same time, most civilizations went through those stages. One can trace the development of human thought through the progress of settlements building. The hunter-gatherers of the late Stone Age, who moved about a wide area in search of food, built the earliest temporary shelters that appear in archaeological records. Excavations at a number of sites in Europe, that date back to before 12,000 BCE show circular rings of stones that are believed to have formed part of such shelters. As time passed by, Man started establishing urban settlements; ancient cities that still exist today in one sense or another include our very own Alexandria, Rome in Italy, Pataliputra in India, and Chang'an in China.

Archaeologists in Action

Whenever an archaeological project is started, a plan shows the objective of the archeologists, the hypothesis they seek to validate, and the methods and techniques to be used to gather and analyze their discoveries.

Archaeologists in charge of excavation projects might decide to dig a wide, shallow pit if the location was used recently for a short time, since it is unlikely any artifacts would be deeply buried. On the other hand, they might decide on a deep, narrow trench if there is a possibility that the site was used for hundreds of years, and therefore many layers would have built up. Usually only a portion of the site is excavated; an excavated site can never be reconstructed so archaeologists must be careful in their assessment before starting to dig.

It is crucial that, during an excavation, careful attention is paid to record keeping. Archaeological sites are divided into a grid of squares using stakes and string; as archaeologists dig into the soil and unearth objects, each is cataloged with the location where it was found using the grid number and how deep it was found. The object is then photographed, cleaned and sketched to document exactly where it was found. This information allows archeologists to later figure out what function the artifact may have had.

Age Matters

Archaeologists haul long hours in laboratories analyzing artifacts and data they find at sites. One of the most important things to research is the age of the artifact, for which there are a variety of techniques to determine, whether by physical or chemical dating methods. Two broad categories of dating or chronometric techniques that archaeologists use are called relative and absolute dating.

Stratigraphy is the oldest of the relative dating methods. It is based on the law of superposition; like a layer cake, the lowest layers must have been formed first so artifacts found in the upper layers of a site will have been deposited more recently than those found in the lower layers. Cross-dating of sites—when one compares geologic strata at one site with another location, and extrapolates relative ages in that manner—is still used today, primarily when sites are far too old for absolute dates to have much meaning.

Radiocarbon, or Carbon-14 dating is probably one of the most widely used and best known absolute dating methods. It was developed by J. R. Arnold and W. F. Libby in 1949, and has become an indispensable part of the archaeologist›s tool kit since. Its development revolutionized archaeology by providing a means of dating deposits independent of artifacts and local stratigraphic sequences.

Radiocarbon dating relies on a simple natural phenomenon. As the Earth's upper atmosphere is bombarded by cosmic radiation, atmospheric nitrogen is broken down into an unstable isotope of carbon; carbon 14 (C-14). The unstable isotope is brought to Earth by atmospheric activity, such as storms, and becomes fixed in the biosphere. Because it reacts identically to C-12 and C-13, C-14 becomes attached to complex organic molecules through photosynthesis in plants and becomes part of their molecular makeup; animals eating those plants in turn absorb it.

The C-14 within an organism is continually decaying into stable carbon isotopes, but since an organism continues to absorb C-14 all through its life, the ratio of C-14 to C-12 remains about the same as the ratio in the atmosphere. When the organism dies, the ratio of C-14 within its carcass begins to gradually decrease; the rate of decrease is 1/2 the quantity at death every 5,730 years.

Keeping Track

Analyzing the location of discovered artifacts can shed light on what kind of activities occurred on the site. For example, soil stains reveal the outlines of prehistoric or historic structures; such as houses, barns, hearths, storage pits, etc.

Archaeologist Bill Hedman discovered the Raven Bluff site in 2007 during the first year of a three-year archaeological survey and testing project centered on the Kivalina River in Northwestern Alaska. The archaeological site contains the remains of a prehistoric camp that dates back to the very end of the last ice age about 11,000 years ago.

The nature of the environment in this area is that during the summer season soil layers are deposited by the wind around 3cm. This is significant because things left behind by the inhabitants of the area would be quickly buried and well-preserved; whoever came later had a whole new layer to deposit their tools and unwanted materials.

Numerous stone flakes were found on the surface of Raven Bluff; when they dug deeper than a meter, they found many bone and tool debris in the bottom of that pit that was eventually dated at approximately 10,000 years old. This collection can teach us about ancient people's diet, hunting tactics and seasonal movements. The site's steady accumulation of soil over hundreds and thousands of years is extremely important since it can help date the objects as well as establish the chronological order of events that occurred on the site.

Different sites are discovered by different means; some are sought out like Raven Bluff, while others are accidently found. In the winter of 1850, a great storm battered Orkney in Scotland, which was a common occurrence; however, on that occasion, the combination of wind and extremely high tides stripped the grass from a large mound and exposed the outline of a number of stone buildings later found to be a Neolithic settlement.

In 1927, planned excavations on the site of 'Skara Brae' took place to reveal the village that had been buried for thousands of years; what is so amazing about it is how well preserved it was. Radiocarbon dating confirmed that the settlement dated from the late Neolithic age and was inhabited for around 600 years, between 3100 and 2500 BCE.

Skara Brae survives as eight dwellings, linked together by a series of low covered passages. Because of the protection offered by the sand that covered the settlement for 4,000 years, the buildings and their contents are incredibly well preserved. Not only are the walls of the structures still standing, and alleyways roofed with their original stone slabs, but the interior fittings of each house also give an unmatched glimpse of life as it was in Neolithic Orkney. Each house shares the same basic design, which is a large square room with a central fireplace, a bed on either side and a shelved dresser on the wall opposite the doorway.

Our ancestors left us their legacy from Stonehenge in England, to Petra in Jordan and The Great Wall of China; monuments that continue to dazzle us. Any archeological site testifies to the ingenuity of humanity, of which archeology is the great keeper of its heritage, where we find our common history and learn great lessons from our diverse and vast human experience.

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History of Science Museum
VISITORS INFO

Opening Hours
Saturday to Thursday [from 10:00 to 15:00]
Guided Tours Schedule
Saturday to Thursday [10:30 + 11:30 + 12:30 + 13:30 + 14:30]

- Museum entry fees are included in all Planetarium show tickets.
- For non-audience of the Planetarium, Museum entry fees are 0.50 EGP.
- Museum Tours are free for ticket holders.

SAVE ENERGY MONEY THE PLANET

By: Shahenda Ayman

Many nations count on coal, oil and natural gas to supply most of their energy needs. A principle problem is that the world will eventually run out of fossil fuels, or it will become too expensive to retrieve those that remain. More importantly, they are the main cause of pollution that is continually ruining the Earth's environment and is the main contributor to an increasingly alarming case of global warming.

Though we still might not be fully capable of harnessing and effectively using them, Mother Nature provides us with sustainable and clean alternatives in the form of renewable energy resources. All we have to do is quit the easy path and work hard to find the right path instead; the path that will secure a future for Earth and life on it.

SOLAR ENERGY

Sunlight, or solar energy, can be used for heating, lighting, cooling homes and other buildings, generating electricity, water heating, and a variety of industrial processes.

The utilization of solar panels is a great way to generate clean and renewable electricity that is capable of powering remote appliances or even partially powering homes or the workplace. With increasingly efficient solar power technologies becoming available, photovoltaic electricity systems may be able to one day power large industrial facilities.

Most forms of renewable energy come either directly or indirectly from the Sun. Heat from the Sun causes the wind to blow; it contributes to the growth of trees and other plants that are used for biomass energy, and it plays an essential role in the cycle of evaporation and precipitation that makes hydropower possible.

WIND ENERGY

Energy of the wind has been used for centuries to sail ships and drive windmills that grind grain; today, wind energy is captured by wind turbines and used to generate electricity. The number of countries that use wind energy is increasing, and many countries already using wind energy are growing their wind turbine stock on annual basis. Overall, wind energy holds great promise, and if the countries that use and develop wind energy stay committed to the cause, it could become a significant source of energy generation by the year 2050.

HYDROPOWER

Water flowing downstream is a powerful and renewable force, constantly recharged by the global cycle of evaporation and precipitation. Flowing water can be used to power water wheels that drive mechanical processes; captured by turbines and generators, like those housed at many dams around the world, the energy of flowing water can be used to generate electricity.

It is, however, also a somewhat controversial form of renewable energy because it has a very large environmental impact. Altering any sort of water system, like a dam on a river for instance, has an intrusive impact on the surrounding ecosystem, and can change it significantly.

On the other hand, hydroelectric dams are an excellent source of power because once they are built they require no additional fossil fuels to operate, and need very little maintenance to remain operational. In fact, some dams have been generating energy for up to one hundred years, which makes them an excellent renewable power source.

GEOTHERMAL ENERGY

The heat inside the Earth produces steam and hot water that can be used to power generators and produce electricity or for other applications, such as home heating and industrial power generation.

Some geothermal power plants use the steam from a reservoir to power a turbine/generator, while others use the hot water to boil a working fluid that vaporizes and then turns a turbine. Hot water near the surface of Earth can be used directly for heat. Direct-use applications include heating buildings, growing plants in greenhouses, drying crops, heating water at fish farms, and several industrial processes, such as pasteurizing milk.

BIOMASS ENERGY

Biomass has been an important source of energy ever since people first began burning wood to cook food and warm themselves. Wood is still the most common source of biomass energy, but other sources of biomass energy include crops, grass and other plants, agricultural and forestry waste and residue, organic components from municipal and industrial wastes, and even methane gas harvested from community landfills. Biomass can be used to produce electricity, as fuel for transportation, or to manufacture products that would otherwise require the use of non-renewable fossil fuels.

Biomass for electricity generation has a higher total usage volume in the USA than in the whole of Europe combined, but the use of biomass for both electricity generation and heat has tripled in the last 13 years in the 15 EU countries. The majority of developing countries are located in warmer regions, and the use of biomass heat, other than for cooking and traditional heating, is limited to the supply of process heat in industry.

HYDROGEN

NASA has used liquid hydrogen since the 1970s to propel the space shuttle and other rockets into orbit. Hydrogen fuel cells power the shuttle's electrical systems, producing a clean byproduct; pure water, which the crew drinks.

Hydrogen has tremendous potential as a fuel and energy source, but the technology needed to realize that potential is still in the early stages. It is the most common element on Earth, but in nature it is always found in combination with other elements. Once separated from other elements, hydrogen can be used to power vehicles, replace natural gas for heating and cooking, and to generate electricity.

Homes could save money and reduce their carbon dioxide emissions by being more energy efficient. The Energy Saving House, one of the coolest hands-on exhibits on display at the ALEXploratorium, is an easy and fun way to show you the full range of energy saving measures that can be made at home if we are really committed to save, not only our money, but our home; Earth.

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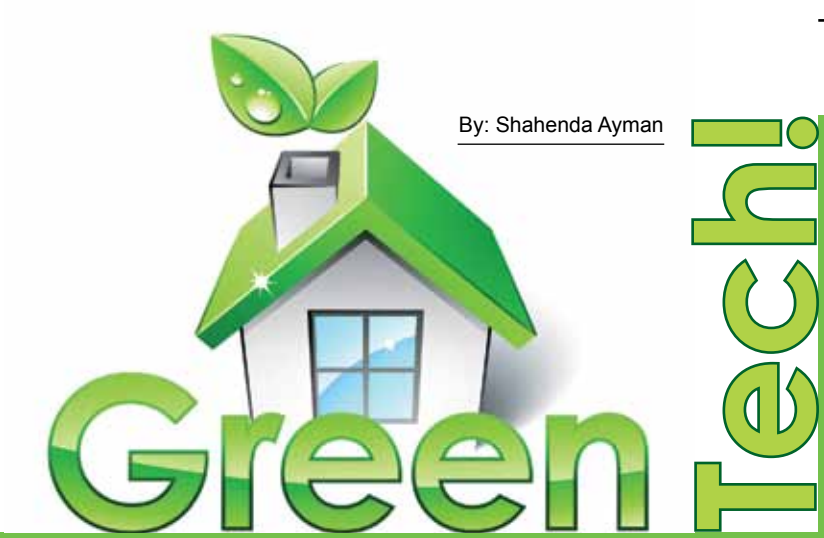

By: Shahenda Ayman

We all want the latest cars, the trendiest clothes, and the shiniest gadgets. What about the price to the planet? Is it possible to go shopping with a clear conscience? Can environmentally sound products still be objects of desire?

New and Improved Light Bulb

A new type of light bulbs that could displace compact fluorescents (CFLs) and Light-Emitting Diode (LED) lamps as the energy-saving bulb of choice is now in the market. The technology, known as cathodoluminescence, or electron-stimulated luminescence (ESL), offers similar energy savings, but provides a more natural quality of light.

CFLs and LED lamps save energy, last longer, and emit less heat than incandescent bulbs. But their light is ickier, versions advertised as "dimmable" often dim only over a limited range and CFLs take long to come to full brightness. The color quality has to do with how these bulbs work.

Like CFLs and LED lamps, the new ESL bulbs use a phosphor; however, one that does not absorb light at all, but absorbs electrons instead. Roughly speaking, ESLs are cathode-ray tubes repurposed as lamps. The electrons stream off a metal cathode plate and are pulled by an electric field toward an anode, a thin layer of metal on the backside of the phosphor.

Because they use a different phosphor, ESLs provide a somewhat more natural light. The manufacturing company claims all sorts of advantages: it turns on faster, shines omnidirectionally rather than in a narrow beam, dims over a wider range, and contains no mercury.

The Eco Kettle

The Eco Kettle looks like a stylish electric jug kettle in appearance; however, it has a special feature that allows the user to fill the kettle to its maximum, but still boil one to eight cups according to requirement.

Each time we boil a kettle we use more water than we need; we also waste valuable energy and contribute to climate change. On average, we could save 90 seconds each time we boil a kettle by putting in only the amount of water we need. The Eco Kettle was invented to specifically meet the challenge of reducing the amount of energy wasted by overfilling your kettle. This easy, simple method of ensuring that you boil only the water that you need means that you can save the planet while on your tea break.

Straddling Bus

Have you ever been stuck in traffic and wished you could just lift off and fly right over everybody? China's new straddling bus concept, designed by Youzhou Song of Shenzen, is about as close as it gets; it promises to be the new solution to the country's pollution problems and highly congested roads.

This 5.4m tall, 7.6m wide public bus, which can carry up to 1,200 passengers, is powered by a combination of municipal electricity and solar power derived from panels on the bus' roofs and at bus stops. It travels at an average speed of 25 mph (40 km) and could reduce traffic jams by 25 to 30% on main routes.

The New York Times reports the straddling bus could replace up to 40 conventional buses, potentially saving the 860 tons of fuel that 40 buses would consume annually, and preventing 2,640 tons of carbon emissions.

Flying Wings

Conventional airliners are heavy, thirsty, noisy and polluting, despite aeronautical designers' best efforts. However, in the future, we may be travelling in a flying wing or batwing, in which the entire fuselage becomes the means of lift; an idea first suggested by Frederick Handley Page in 1961.

Made of plastic and with areas of the surface punctured with tiny holes to reduce drag, the wings would be much lighter and so more fuel efficient. The engines would be mounted on top to deflect noise away from the ground. They would be flown differently, too, to reduce fuel consumption and avoid formation of polluting condensation trails. The result could bring aircraft emissions below today's levels by 2025, despite an expected doubling in the amount of passenger air traffic.

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Visitors INFO

Discovery Zone

Opening Hours

Saturday, Sunday, Monday, Wednesday and Thursday: [From 09:00 to 15:30]
Tuesday: [From 08:30 to 12:30]

Guided Tours Schedule

Saturday, Sunday, Monday, Wednesday and Thursday: [09:30 - 11:00 - 12:30 - 14:00]
Tuesday: [09:30 - 11:00]

Entry Fees

Students	EGP 2	Non-students	EGP 4

Listen and Discover

- For the list of shows available at the "Listen and Discover" and the schedule, please consult the Centers official website: www.bibalex.org/psc.
- For reservation, please contact the PSC Administrator at least one week before the desired date.

Show fees

DVD shows:

Students	EGP 1	Non-students	EGP 2

3D shows:

Students	EGP 2	Non-students	EGP 4

1ST SCHOOL SEMESTER 2011/12

WORKSHOPS & PROGRAMS EVENTS

Blue Gold

Without water, there would be no life. It is vital for all forms of life; it constitutes 70.9% of the Earth's surface and makes up about two-thirds of the human body. In this workshop, students learn about the properties of water and its natural cycle, in addition to other intriguing phenomena, such as surface tension.

- Target age group: 8–10 years

A Plant's Life

What is the importance of plants? How do they grow from seeds? How do they make their own food to live? And, how do they reproduce? In this workshop, students observe the environment where plants grow and learn how they feed; they study plants' characteristics and components, and understand the impact they have on life.

- Target age group: 9-11 years

The Solar System in 90 Minutes

Astronomy is one of, if not the oldest sciences; it is the study of our universe, its origin and nature, celestial bodies and phenomena that originate outside the Earth's atmosphere. This workshop unravels fascinating facts about the Solar System and its different celestial bodies through model-making and a selection of hands-on activities.

- Target age group: 9–11 years

What is the "Matter"?

Matter is all around; but, what is it? What are the states of matter? And, what are the physical and chemical changes that occur to it? This workshop helps students know more about the properties of matter, its classifications and other relative phenomena through a diversity of interesting hands-on experiments.

- Target age group: 9–11 years

Space Adventure

Who would not like to explore the outer space with all its mysteries? Through model-making, hands-on activities, slide shows and movies, this workshop takes students on a riveting journey to unravel the secrets of astrophysical phenomena, such as meteorites, constellations, cosmic collisions, orbital forces, and many more fascinating facts, trends and occurrences.

- Target age group: 12–14 years

Electrify Your Life

Humans have an intimate relationship with electricity, to the point that it is virtually impossible to separate our life from it; it lights up our world and powers it. Through a number of exhilarating hands-on experiments, students learn about conductivity, Ohm's law and storing energy, among a variety of other electrifying facts.

- Target age group: 12-14 years

Water Treatment

Water treatment is the processes used to make water more acceptable as drinking water, in industrial processes, and in medical uses among other uses. In this workshop, students learn the steps of water treatment through a variety of hands-on activities that tackle processes such as pre-chlorination, sedimentation, filtration, desalination and disinfection.

- Target age group: 12-16 years

Chess Club

In cooperation with the Egyptian Chess Federation, this program aims to develop and sharpen children's skills. Chess is an exercise of infinite possibilities for the mind; one which develops mental abilities used throughout life: concentration, critical thinking, pattern recognition, strategic planning, creativity, analysis, synthesis, and evaluation, to name a few. Chess is also a highly effective tool for teaching problem-solving and abstract reasoning. Through chess, we learn how to analyze a situation by focusing on important factors and eliminating distractions.

- Target age group: 6-14 years

Starting Point

Combinations of 26 letters make up every word in the English language, 28 in the case of Arabic. Similarly, every material in the world is composed of different combinations of about 100 elements that cannot be broken down into simpler substances through ordinary chemistry.

Categorizing and looking for patterns in matter started in ancient times. In Aristotle's time, water, fire, earth and air were considered the basis for everything. Over time, many observations and experiments, in addition to the discovery of new elements, led to the scientific classification system of elements based on common characteristics and behaviors known as the periodic table.

What is the periodic table? How are elements arranged? How are element groups defined? During this program, students learn the answers to these questions and more. They learn the history of the periodic table, play games, and conduct hands-on experiments; they also get to build their own periodic tables.

- Target age: 12-16 years

Planetarium Science Center
Summer Program 2011

2011 A Shaky

By: Noha Rahhal

2011 has so far been a year of momentous changes and startling events. While political uprisings and revolutions have shaken the Middle East and North Africa (MENA) region, Mother Nature has taken it upon itself to top those with mega natural events; most prominently evident in the eruption of yet another Icelandic volcano and a 9.0-Richter-scale earthquake/tsunami(1) double hit that struck off the coast of Japan, sweeping over cities and farmland, setting off warnings as far away as the west coast of the United States and South America, and triggering the worst nuclear emergency since Chernobyl.

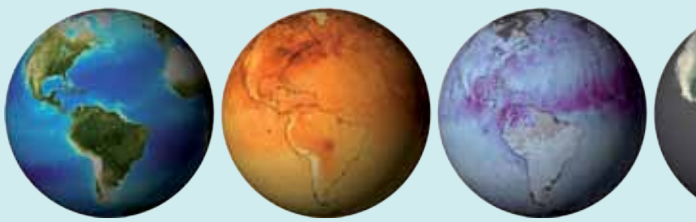
While watching the news, I found that keeping track of recent political news, though unfamiliar, is quite easy in comparison to wrapping my head around the causes and consequences of those natural "disasters". I have thus begun searching for the "nature of Earth" in an attempt to figure out those phenomena that shape and reshape our planet, yet still unpredictable in a world full of revolutionary scientific discoveries and theories.

Flashback

In the not too distant past, cartographers(2) charted the deep ocean trenches, seismologists(3) plotted earthquakes beneath the trenches, and volcanologists(4) studied the overlying volcanoes. However, they worked independently of each other, unaware that the phenomena they studied were all part of a singular process. Today, the understanding of sea-floor spreading and subduction(5) clarifies why so many of the world's volcanoes are situated on the Pacific island arcs, the Ring of Fire, where Earth's tectonic plates are being subducted beneath deep ocean trenches.

Four billion six hundred million years ago the Earth was born from a cloud of dust and fire orbiting the Sun. Racked with volcanoes, bombarded by asteroids and comets, Earth was incredibly hot with a sea of molten rock covering its surface. Over time, the Earth cooled and separated into several different layers. The matter with the highest density, mostly iron, sank to form Earth's solid inner core, which is enveloped by a less dense mixture of nickel and iron; the outer core. Surrounding the inner and outer core is the mantle, divided into several distinct layers. Finally, over the mantle rests the Earth's crust, a thin veneer of rocky material.

At depths of as much as 725 km, tectonic plates become so hot that they soften and stop generating earthquakes. However, the descent and melting continues until the plate blends with the surrounding mantle material. Eventually, this material emerges along Mid-Ocean Ridges(6) where plates are continually pulling apart from each other, oozing hot magma(7) to fill the crack continuously created by plate separation. As the lava cools, it attaches itself to the trailing edge of each plate forming new sea-floor crust; a process commonly known as sea-floor spreading. The subduction process thus comes full circle and our tectonic planet continues to evolve.



An Ever Changing Earth

Earth's outer shell, the lithosphere, long thought to be a continuous unbroken crust is actually a fluid mosaic of many irregular rigid segments, or plates. Comprised primarily of cool, solid rock 6 to 60 km thick, these enormous blocks of Earth's crust vary in size and shape, and have definite borders that cut through continents and oceans alike.

Powered by forces originating in Earth's radioactive, solid iron inner core, these tectonic plates move ponderously about at varying speeds and in different directions atop a layer of much hotter, and softer, more malleable rock called the athenosphere. Because of the high temperatures and immense pressures found here, the uppermost part of the athenosphere is deformed and flows almost plastically just beneath the Earth's surface. This characteristic of the athenosphere allows the plates to inch along on their endless journeys around the surface of the Earth, moving no faster than human fingernails grow.

As eons pass, continents and other land masses collide, break apart, and drift across the planet on the fiery mantle beneath, opening and closing oceans along the way. Subsequently, their relative position to the equator, the poles, and each other changes over long periods of time.

The Ring of Fire

The Pacific Ring of Fire is home to 452 volcanoes and about 90% of the world's earthquakes. It extends along multiple places, including the Andean Volcanic Belt, Bolivia, Chile, and many locations in Central America, North America, Russia, Philippines, Indonesia, New Zealand, and Antarctica. Trying to understand why such locations are loaded with earthquakes and volcanoes, I thought it would be a good idea to start at the beginning by exploring the nature of each phenomenon.

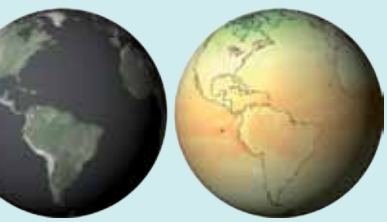
Volcanoes are vents on the Earth's surface where magma, formed by the increase of temperature and pressure as we go deeper into Earth, is emitted. Pressure actually slows down the effect of high temperature on rocks, thus hindering the rocks' melting process; by increasing pressure, matter is in its most dense state. Introducing water (H_2O) also has a major role in the melting process because it weakens the atomic bonds in minerals.

When we look at the location of Earth's 500 active volcanoes around the world, we find that they are all manifestations of the three different main factors contributing to the eruption of volcanoes and the formation of magma. In Hawaii, heating is the melting mechanism; in Iceland, it is depressurizing; whereas in the South American Andes, it is the introduction of water.

Frequency of volcanic eruptions is a popular way of classifying magmatic volcanoes. Volcanoes that erupt regularly are called active; their lifespan can vary from months to several million years. Volcanoes that have erupted in the past but are now quiet are called dormant, while those that scientists consider unlikely to erupt again because they no longer have a lava supply are called extinct.

Volcanoes are often considered to be extinct if there are no written records of its activity; nevertheless, volcanoes may remain dormant for a long period of time. Throughout history, there are many examples where some volcanoes were considered to be extinct, but later turned out to be dormant. A case in point is the long-dormant Soufrière Hills volcano on the island of Montserrat, thought to be extinct before activity resumed in 1995.

Year Full of Hot Events



Iceland on Fire

This year, the world has witnessed three volcanic eruptions; in Iceland, Chile and, most recently, in Eritrea. Iceland is a place where volcanoes are recurrent; last year, the notorious Eyjafjallajokul eruption affected European airspace severely and left thousands of air travelers stranded. This year, Grimsvotn, Iceland's most active volcano, erupted causing similar consequences though not as devastating as last year's.

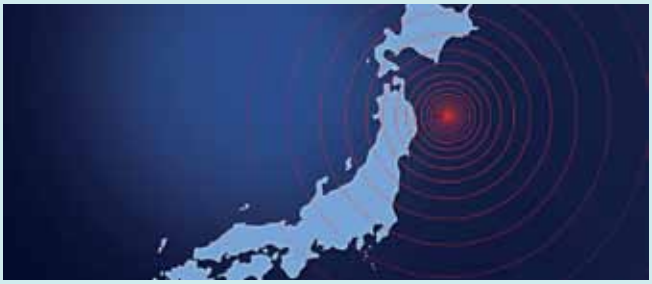
Grimsvotn has been one of Iceland's most active volcanoes for more than a hundred years. Its eruption has been largely feared; however, after it has actually erupted, it seems that the fears have been overrated. There was a plume of smoke that rose about 20 km into the sky, but the winds were not very strong; hence, the heavy ash did not spread as much. The ashes were also very coarse that they fell to the ground more quickly instead of floating long distances.

Knowing that Iceland is famous for its active volcanoes, I assumed this must negatively affect people's life there or the country's economy. To my surprise, it seems volcanoes are a sightseeing attraction in Iceland and have actually long drawn tourists from across the globe, eager to catch a glimpse of a pillar of smoke or a spectacular lava flow. Nevertheless, volcanoes are not always that friendly in Iceland. A case in point, the Grimsvotn and Laki eruptions from 1783 to 1785, which produced a lava flow that consumed vast swathes of land, blotted out the Sun and killed a quarter of the population through poisoning or famine.

Japan on the Dangerous Move

This year, we have also witnessed in shock and horror the unfolding devastation of Japan's rattling earthquake, followed by enormous tsunami waves, both of which swept away entire cities, culminating in the catastrophic failure of nuclear power plants reactors in the struck down region.

Earthquakes occur in areas where the stretching or compression of plates causes slight fractures in the Earth's crust. These areas of crustal stress are called faults, of which there are essentially two types. Normal faults occur where tension within the Earth stretches the crust to form a basin, or range, with fault-block mountains flanking the basin; while reverse faults occur where compression squeezes the crust together as one block of land slides over another forming overthrust mountains.



Another type of fault occurs where plates are sliding, shearing or grinding past each other, folding mountains and producing earthquakes in the process. These plate boundaries are called lateral, or transform faults, and they are found where significant movement occurs along a fracture in the Earth's crust.

Japan's earthquake early this year was huge in magnitude by laymen's terms; however, some scientists do not consider it that big of an event. Magnitude, thus, does not always determine the seriousness of earthquakes where scientists are concerned; some actually claim the earthquake happened in the "wrong" place. Seismologists have long predicted that "The Big One" would probably be a repeat of the 1923 Kanto earthquake, which occurred in a dangerous fault zone close to Tokyo and killed an estimated 142,000 people.

Although the earthquake itself was not seen as a great threat by many seismologists, its massive magnitude unleashed a fierce tsunami that claimed hundreds of lives and was felt as far away as the west coast of North America, about 8,000 kilometers away. Much of this has to do with the depth of the ocean that the tsunami waves traversed, as well as the sheer size of the quake.

Normal waves that we are accustomed to are mostly driven by the wind, so they travel at the speed that the wind blows; however, in a tsunami, the speed depends on the depth of the water. Out in the open ocean, for example, where it is 5,000 meters deep, the speed of a tsunami wave will be about 220 m/sec; the speed of the waves in 500-meter-deep ocean drops to about 70 m/sec. If there is a lot of deep ocean between where a tsunami starts and where it is going, these waves will get there extremely fast.

As the mass of water approaches a shoreline, it slows down, so the water at the front of the wave moves slower than the water coming in at the back of the wave. As a result, we get this huge piling up effect of the water, which can increase when it approaches the shoreline by several meters and stay that way for a long period of time because of the wave's very long wavelength.

Eyebrows were raised during the Japanese catastrophe as many were puzzled by how Japan, in all its technological might, was not prepared for such a disaster. The problem is that scientists have no solid records of past earthquakes; thus they are unable to predict future similar events to get ready to face them accordingly.

Glossary

(1) A **Tsunami** is a series of water waves caused by the displacement of a large volume of water, usually an ocean. Owing to the immense volumes of water and the high energy involved, tsunamis can devastate coastal regions.

(2) **Cartography,** from the Greek *chartis* meaning map and *graphein* meaning to write, is the study and practice of making maps. Combining science, aesthetics and technique, cartography builds on the premise that reality can be modeled in ways that communicate spatial information effectively.

(3) **Seismology** is the scientific study of earthquakes and the propagation of elastic waves through the Earth. The field also includes studies of earthquake effects, such as tsunamis, and diverse seismic sources, such as volcanic, tectonic, oceanic, atmospheric and artificial processes.

(4) A **volcanologist** is a person who studies the formation of volcanoes, and their current and historic eruptions; they frequently visit volcanoes, especially active ones, to observe volcanic eruptions and collect eruptive products.

(5) **Subducion** is the process that takes place at convergent boundaries by which one tectonic plate moves under another, sinking into the Earth's mantle as the plates converge.

(6) The **Mid-Ocean Ridge System** is a 56,000 km long series of mountains and valleys that marks where the Earth's crustal plates are moving apart.

(7) **Magma** is a mixture of molten rock, volatiles and solids that is found beneath the surface of the Earth. Besides molten rock, magma may also contain suspended crystals and dissolved gas and sometimes also gas bubbles.

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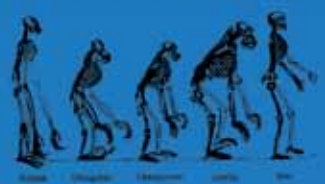
A Blooming Earth



By: Sara Khattab

For billions of years, Earth has possessed the materials and suitable conditions for supporting an inconceivable myriad of life forms. The greater the biodiversity is, the more resilient species and systems are; loss of biodiversity weakens them, making them more vulnerable to extinction. If a large proportion of the biosphere is invested in only a small number of species, such as humans and their associated domesticated or cultivated species, this will result in an inherently unstable system.

Biodiversity, as well as the interactions and functions within ecosystems, have developed and evolved over countless years. Changes that have occurred ever so slowly over time have allowed for the adaptation of species and ecosystem survival. However, catastrophic and rapid changes can have a disastrous effect on ecosystems and biodiversity of species. Among these are natural events, such as volcanic eruptions, earthquakes, tsunamis, droughts, floods and hurricanes. Other disruption and destruction of the natural environment and biodiversity occurs through rapid and harmful human activity.

Biodiversity awareness and preservation is now one of the most crucial global issues; this "newly" found revelation most certainly intrigues us to wonder how it all came about.

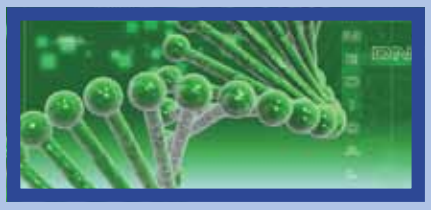
Life in the Making

Research on how life might have emerged focuses on three possible starting points. The first is self-replication, which is an organism's ability to produce offspring that are very similar to it. The second is metabolism, which is the ability to feed and repair itself; and, third, external cell membranes, which allow food to enter and waste products to leave.

It is suggested that around three billion years ago, auotrophic species diversified from previous species. These autotrophs are capable of synthesizing its own food from inorganic substances, using light via the Sun or chemical energy elements on Earth; green plants, algae, and certain bacteria are autotrophs.

During the long interval of the Precambrian—approximately 90% of geologic time and including three eras; the Hadean, the Archean and the Proterozoic—the only inhabitants of the Earth were simple microscopic organisms; many of them comparable in size and complexity to modern-day bacteria. The conditions under which these organisms lived differed greatly from those prevailing today, but the mechanisms of evolution were the same.

From RNA to DNA



During the Hadean Era, the earliest life appeared, possibly derived from self- reproducing RNA molecules. The replication of these organisms required resources like energy, space and smaller building blocks, which soon became limited, resulting in competition with natural selection favoring molecules that were more efficient at replication. DNA molecules then took over as the main replicators and archaic genomes soon developed inside enclosing membranes that provided a stable physical and chemical environment conducive to their replication; proto-cells.

And then there was Oxygen

It may seem surprising that bacteria can leave fossils at all. However, one particular group of bacteria, the cyanobacteria or "blue-green algae", left a fossil record that extends far back into the Precambrian. Cyanobacteria are a phylum[1] of bacteria that obtain their energy through photosynthesis; they use water as a reducing agent, thereby producing oxygen as waste product. The ability of cyanobacteria to perform oxygenic photosynthesis is thought to have converted the early reducing atmosphere of the Archaean Era into an oxidizing one, which dramatically changed the composition of life forms on Earth.

Simple to Complex

Early cells belonged to the group of prokaryotic cells, which are small cells lacking the complex internal structures, like mitochondria[2] and chloroplasts[3], found in eukaryotic[4] cells. Fossils of both primitive single-celled and more advanced multi-cellular organisms began to appear in abundance in rocks during the Proterozoic age. At this time, biological diversity increased greatly becoming eukaryote cells, which contain complex structures enclosed within membranes. The defining membrane-bound structure that sets eukaryotic cells apart from prokaryotic cells is the nucleus, or nuclear envelope, within which the genetic material is carried.

Emerging Faunas

The first animals in the fossil record appeared between 620 and 550 million years ago, during the period called the Vendian, also known as the Ediacaran; this period is distinguished by a characteristic collection of fossils from complex soft-bodied animals that have been found at several localities around the world.

Ediacaran/Vendian faunas have puzzled palaeontologists[5] for two main reasons. First, there does not seem to be any evidence for any skeletal hard parts in any of those fossils, meaning that organisms were soft bodied. The other confusing aspect is that, although some of those organisms may have belonged to groups that survive today, others do not seem at all related to animals we know.

An Animal Explosion

Most modern phyla of animals began to appear in the fossil record during the Cambrian Period.

Cambrian fossils include animals with body plans similar to those of a number of living animals today; this stunning and unique evolutionary flowering is termed the "Cambrian Explosion". It was not, however, as rapid as an explosion; the changes seem to have happened during about 30 million years.

The cause of the Cambrian Explosion is a matter of debate among scientists. Some point to the increase in oxygen supporting a higher metabolic rate and allowing the evolution of larger organisms and more complex body structures. Others propose that an extinction of life at the end of the Vendian Period opened up ecological roles that the new forms exploited. A change in ocean chemistry may have occurred, allowing for the first time the development of hard body parts, such as teeth and supporting skeletons.

Genetic factors were also crucial; recent research suggests that the period prior to the Cambrian Explosion saw the gradual evolution of a "genetic tool kit" of genes, the homeobox or "hox" genes, which govern developmental processes. Once assembled, this genetic tool kit enabled an unprecedented period of evolutionary experimentation and competition.

The Rise of Fish

Vertebrates originated about 525 million years ago during the Cambrian Explosion; the first jawed vertebrates appeared in the Ordovician Period and became common in the Devonian Period, often known as the "Age of Fishes".

Fish are members of the chordate phylum because they display certain defining characteristics; a backbone, a dorsal nerve, gills and a tail. Agnathans, or jawless fish, were the earliest fish and the first true vertebrates; they appeared around 480 million years ago. As jaws evolved in bony fish and early sharks around 450 million years ago, jawless fish had trouble competing; hagfish and lampreys are the only jawless fish alive today.

From Fish to Amphibians

The first major groups of amphibians developed in the Devonian Period. The first tetrapods, or four-limbed land-living vertebrates, appeared during this period, as did the first terrestrial arthropods—invertebrate animals with an exoskeleton, a segmented body and jointed appendages—including wingless insects and the earliest joint-legged arachnids that had already ventured onto land during the Silurian Period. In the oceans, brachiopods, which are a phylum of marine animals that have hard valves or shells on the upper and lower surfaces, flourished.

In the Carboniferous Period, amphibians moved up in the food chain and began to occupy the ecological position currently occupied by crocodiles. During the Triassic Period, the better land-adapted proto-crocodiles began to compete with amphibians, leading to their reduction in size and importance in the biosphere.

Large Lizards

Several major biological, geological and climatic events occurred during the Carboniferous Period leading to one of the greatest evolutionary innovations. The amniotic egg allowed the ancestors of birds, mammals and reptiles to reproduce on land by preventing the embryo inside from drying out, so eggs could be laid away from water. It also meant that, in contrast to amphibians, reptiles lay fewer eggs; they had no larval stage and fertilization was internal.

Organisms of the Triassic, the earliest of the three Mesozoic periods, are those that survived the mass extinction in the late Permian, the last of the Paleozoic periods; survivors included plants and mammal-like reptiles. New groups flourished briefly, while others went on to dominate the Mesozoic world; these include modern conifers and dinosaurs.

During that period, major changes took place in the posture of several groups of reptiles; they shifted from the standard "sprawling mode" to an "erect" posture. Dinosaurs, thus, fell into two initial groups on the basis of their hip structure. One group is the Ornithischian; the other is the Saurischian, which is further subdivided into sauropods and theropods, from which most scientists agree that birds evolved.

Here Come The Mammals

Mammals are advanced synapsids, one of two great branches on the amniote family tree; the branch that includes us. First appearing in the Carboniferous Period, synapsids are easily separated from other amniotes by having an opening low in the skull roof behind each eye, leaving a bony arch beneath each, which gives synapsids stronger jaw muscles and jaws than previous animals. Primitive synapsids are usually called pelycosaurs; more advanced mammal-like ones, therapsids and cynodonts, led to true mammals. Over time, the synapsid way of walking became more upright and tail length decreased.

The mass extinction at the end of the Cretaceous Period 65 million years ago wiped out dinosaurs along with every other land animal that weighed much more than 25 kg. It was, nevertheless, less catastrophic than the previous mass extinction at the end of the Permian Period though it has attracted more research than any other extinction events.

The Age of Man

The current Holocene Period, which started around 10,000 years ago, is often called the "Age of Man". However, this is somewhat misleading because modern humans evolved and spread over the planet well before the Holocene began. Some DNA evidence suggests that the ancestors of modern apes and humans evolved 22-33 million years ago; however, abundant fossils did not appear until the Miocene.

Chimps, gorillas, orangutans, gibbons and siamangs are classified with humans in the same superfamily; Hominoidea. We actually share about 98.8% of our DNA with chimpanzees, which are, thus, our closest relatives amongst primates of the same family; Hominidea.

The first species of the genus Homo evolved in Eastern Africa about 2.5 million years ago. Members of this genus feature prominent jaws and large brains relative to those of apes; back then, they probably lived in groups in or near forests and some later made and used tools. Even the earliest ancestors of the Modern Man could walk upright on two legs; this adaptation afforded certain advantages, such as the ability to see over the top of high vegetation and to easily carry food or tools and weapons while traveling.

Since the rise of the first civilizations, humans have influenced the global environment in a manner quite unlike that of any other organism. Some estimates indicate that as many as 20% of all plant and animal species present today will be extinct by the year 2025. More information is needed to determine whether the current and expected levels of extinction are in line within the natural background levels of species replacement, or whether these have been accelerated by human practices, such as hunting, pollution, flood control and deforestation into what has been described as the sixth major mass extinction event.

Moreover, the vast majority of scientists agree that human activity is responsible for "global warming"; an observed increase in mean global temperatures that is still going on, and which may have totally unpredictable effects.

The Holocene, however, has also seen the great development of human knowledge and technology, which can be used to better understand global changes and predict their effects, and to stop or salvage the damage they may do to the Earth and to us.

Glossary

(1) **Phylum:** In biology, a phylum is a taxonomic rank below kingdom and above class.

(2) **Mitochondria:** A small intracellular organelle that is responsible for energy production and cellular respiration.

(3) **Chloroplasts:** The organelles that carry out photosynthesis and starch grain formation.

(4) **Eukaryote:** An organism that consists of one or more cells, each of which has a nucleus and other well-developed intracellular compartments.

(5) **Palaeontologist:** A specialist in the study of fossils that determines the structure and evolution of extinct animals and plants, and the age and conditions of deposition of rock strata in which they are found.

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TROUBLED WEATHER REEKS HAVOC ON EARTH!

By: Shahenda Ayman

By definition, the weather is "the state of the atmosphere at a given time and place, with respect to variables such as temperature, moisture, wind velocity, and barometric pressure".

Go back about 4.6 billion years and you would not find the Earth. You would find molecules and particles slowly forming a gaseous mass inside a nebula. Over time, these gases eventually condensed into liquid and solid forms. Some of it cooled to form the continents and oceans, but much of the Earth's center still burns with furious heat. The atmosphere sits on the surface of this sphere.

Scientists think that the Earth's original atmosphere escaped from within the planet itself, where it formed in the heat of radioactive decay. By today's standards, this air was utterly unbreathable; rich in methane, ammonia, water vapor and neon. There was no free oxygen (O_2) at all. You might think this had to change before organisms could evolve on the planet, but it was actually the steady evolution of unicellular organisms that produced oxygen and brought about the change in the atmosphere's makeup. Over hundreds of millions of years, this evolved into the air that fills your lungs today.

Currently, the atmosphere is composed of 78% nitrogen, 21% oxygen, 0.9% argon, and 0.03% carbon dioxide. The remaining 0.07% consists of water vapor, hydrogen, ozone, neon, helium, krypton and xenon. However, this is not the finished recipe for Earth's atmosphere, for the process of evolution that created it continues to this day. Not to mention that other agent of change to consider: human beings.

While some date human influence on global climate back to the industrial revolution of the 1800s, others look back several thousand years to the agricultural revolution. Environmental scientists such as William F. Ruddiman argue that carbon dioxide concentrations began to rise 8,000 years ago due to early slash-and-burn[1] agriculture practices in Asia, India and Europe.

Human industrial activity that relies on burning fossil fuels, such as coal and petroleum products, has been generating the greenhouse gases-carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O)-in large quantities since about 1750. Atmospheric models predict that elevated greenhouse gases will intensify global warming and influence weather patterns which will cause melting of polar ice and destroy the habitat of animals such as the polar bear. The increase of global temperatures will also reduce the amount of snow deposited on mountains; thus, decreasing the flow of water in rivers, which are used for navigation, irrigation and as source of drinkable water. CO_2 will also increase sea water acidity and threaten coral reefs and other life forms.

Today, the concentration of atmospheric CO_2 is 380 parts per million (ppm) and the North Pole's mean annual temperature is -20°C. Analysis of core sediments in the Arctic indicates that, 55 million years ago, CO_2 concentration was 2,000 ppm and the North Pole's temperature averaged 23°C.

Satellite images by NASA show approximately a 20% reduction in the Earth's minimum ice cover between 1979 and 2003; Arctic perennial sea ice has been decreasing at a rate of 9% every ten years. At this rate, the summertime Arctic Ocean will be ice-free before the year 2100.

There is a large amount of water stored as ice over the landmasses of Greenland and Antarctica. If the ice sheets melt, the resulting rise in global sea level will flood many coastal areas around the world. The combined effect of melting all the ice on Greenland and Antarctica would result in a sea level rise of 65 meters.

Meteorology, History of

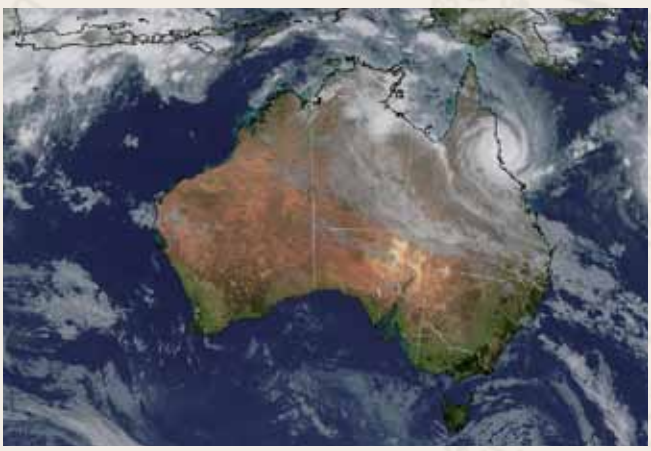
Every night, billions of people around the world tune in to the weather forecast. Once we hear the forecast, we then plan our daily activities accordingly. But how did weather forecasting develop?

Historically, forecasting weather conditions was based solely upon observations of the sky. This method of simple observation prevailed until 1643, when Italian physicist Evangelista Torricelli invented the barometer; a simple device able to measure air pressure. Torricelli noticed that air pressure changes in accordance with changes in the weather; in fact, a drop in pressure would often signal that a storm was coming. Atmospheric humidity was also measured when the hygrometer was invented in 1644. Then, in 1714, German physicist Daniel Fahrenheit developed the mercury thermometer; it hence became possible to accurately measure the weather.

It was in 1765 that daily measurements of air pressure, moisture content, wind speed and direction were first made. This was done by French scientist Laurent Lavoisier; however, things were not as simple as he had thought. In 1854, a warship and 38 merchant vessels sank in a fierce storm off the Crimean port of Balaklava. On checking meteorological records, it was seen that the storm had actually formed two days prior to the sinking and had swept across Europe from the southeast. If a tracking system had been in place, the ships could have been warned of the pending danger. As a result of these findings, a national storm warning service was set up in France. This is recognized as the start of modern meteorology.

In the mid 1800s, there was still no quick way of transferring weather data from one location to the next; often the weather that was being warned about would arrive before the data did. That was until Samuel Morse invented his electric telegraph to allow speedy transference of information. Morse's invention made it possible for the Paris Observatory to begin publishing the first modern weather maps; by 1872, Britain's Meteorological Office had followed suit. From then on, acquiring weather data became more and more complex, as did the resulting meteorological maps.

In the 20th century, much sophisticated meteorological equipment was developed. Today, weather stations release balloons that carry what are called radiosondes, which are instruments that can measure atmospheric conditions and then radio the information back to the station. Of course, weather stations today also use radar. In 1960, the world's first weather satellite was sent into space equipped with a TV camera. Today, weather satellites orbit the Earth from pole to pole, while geostationary satellites stay in a fixed position above Earth to constantly monitor one part of the globe.



Storms Ahead

According to the Worldwatch Institute [www.worldwatch.org], in 1998 alone, severe weather caused more than 30,000 deaths and close to USD 90 billion in damages. Hurricanes ravaged coastlines; tornadoes plowed the land with record force; rain battered crops and left millions of people homeless worldwide.

Powerful storms such as thunderstorms, hurricanes and tornadoes are generated when warm, light air rises quickly into higher, colder levels in an unstable updraft that can reach over 160km per hour. Each type of storm forms under specific conditions; understanding the conditions that give rise to powerful storms is the key to preparing for their devastating effects.

Thunderstorms

At any given moment, there are an estimated 2,000 thunderstorms in progress over Earth's surface. These storms can vary from relatively mild rainstorms to very damaging storms that feature hail and high wind. Thunderstorms form when warm air rises from Earth's surface and moves upwards quickly into the colder levels of the atmosphere. If conditions are right, tornadoes can form from this rapid updraft. Normally; however, the result is rain, wind, lightning and thunder.

Without lightning, there would be no thunder, which is the noise lightning makes as it travels through the air. Lightning occurs during all thunderstorms, though not every time it rains. During a storm, it strikes Earth 100 times each second. Lightning causes billions of dollars in damage each year.

Lightning forms when updrafts of air carry water droplets, which have a charge, upward to heights where some freeze into ice and snow particles forming a cloud. As these particles begin to fall back to Earth, charges within the cloud become mixed; the differences in charge are released as lightning. We normally hear the thunder moments after we see the lightning because light travels faster than sound.

Spinning Air

Both tornadoes and hurricanes are spinning columns of air capable of causing great damage. There are important differences between these two powerful storms, however; tornadoes are more localized and typically found on land, while hurricanes can cover vast areas and draw their power from the warm tropical oceans.

Tornadoes range from only a few meters to 1.6km in diameter and are short in duration, normally only a few minutes long. Though localized, they can be extremely violent; the wind speed inside a tornado's funnel can exceed 322km per hour, enough to turn everyday objects into deadly projectiles. Tornadoes occur all over the world, at every time of the year, but they are most common in summertime in the mid-western United States where the propensity for tornadoes has earned it the name Tornado Alley.

Tornadoes form from thunderstorms; an unstable column of warm air rising within cumulus clouds can start to rotate because of changing wind directions at or near the ground. These updrafts alter the air's rotation from horizontal to vertical, creating conditions in which a funnel can develop. If conditions are right and the funnel forms, it can extend to the ground, forming a tornado.

All thunderstorms are capable of producing tornadoes, but detection is still a difficult task. Weather forecasters can identify the cloud features and conditions that normally precede these storms, and they know where they are most likely to occur; still, predicting the exact time, location and intensity of tornadoes is very difficult.

Tornadoes threaten towns or counties, but hurricanes play themselves out on a much larger stage. These large storms can last for days or weeks and cover thousands of kilometers of territory. Hurricanes draw their strength from the warm tropical waters of the ocean. Unlike tornadoes, they lose their power source when they leave the ocean; once on land, they gradually dissipate.

The Great Debate

While scientists debate what is causing the changes in our climate, with the increase of devastating recent events, many fear global warming will cause an increase in tornadoes and hurricanes.

According to hurricane historian Jay Barnes of Pine Knoll Shores, North Carolina, ocean heat is the key ingredient for hurricane formation. More heat could "generate more storms and more intense hurricanes," he said.

Numerous studies in recent years have found no evidence that the number of hurricanes is increasing because of the rise in global temperatures. However, a new study published in *Nature* by Kerry Emanuel, a professor of atmospheric science at the Massachusetts Institute of Technology (MIT), found that the duration and strength of hurricanes have increased by about 50% over the past 30 years. These upswings correlate with a rise in sea surface temperatures.

Most scientists say the rise in sea surface temperature in the last 30-50 years is a signal of global warming. "That is their conclusion, not mine," Emanuel said, "[but] it would follow reasonably well from this metric that the upswing [in intensity] is a result of global warming". According to Emanuel, if global temperatures continue to rise, it is reasonable to assume that hurricane activity will increase, as there is more heat to drive storms.

It is also worth mentioning that the unusually high number of tornadoes that occurred in certain parts of the USA in 2008 happened when those areas were hitting record warm temperatures. If those warmer than normal temperatures were caused by some worldwide global warming, then we would conclude global warming will also increase tornadoes in some areas.

Hanging Out to Dry

In Africa, when the Nile River floods, it provides the entire Nile Delta with water and fertile soil. Flood water covers the plains where crops are planted, bringing with it silt and nutrients from the river, and depositing them into the soil. The Egyptian culture flourished because of these floods. On the other hand, in China and Japan, rice, which depends on deliberate flooding, is one of the main crops. If farmers do not flood the rice crops, not only will the countries' economies be devastated, but the people will starve.

In India, Pakistan and Malaysia, though the monsoons[2] cause extensive flooding, they are essential; they provide many parts of the world with its water for the entire year. It is a massive drought if the monsoons only bring half as much water as usual; in recent years, the monsoons have brought even less.

Droughts are the prolonged absence of water in a specific area; they are always naturally caused, usually due to changes in weather patterns that greatly decrease rainfall. This is common in the southern edge of the Sahara desert, where there are usually extended periods of rain that provide the region with the water it needs for the year. However, it has become increasingly common for the rains to be very weak, or not come at all. A glaring example was a five year drought in the area during the years 1968-73. Today, the effects of global warming are evident in the Sahara's expansion due to these droughts.

The USA is now in the midst of one of the biggest droughts in its history. Groundwater is disappearing and the rivers are running dry. This is leading to increased and more devastating forest fires; moreover, rural fire fighters who depend on natural sources of water such as lakes and rivers to fight fires are "hung out to dry".

Researchers found that as global temperatures rose, so did the risk of forest fires, droughts and flooding caused by the sudden runoff of heavy rainfall.

Marko Scholze, a climate scientist at Bristol University, said, "research showed that if the global average temperature rose by more than 3°C over the next 200 years, as widely predicted, there is a higher risk of extreme instances of forest fires or floods". "We looked at extreme events and what we found was that a once-in-a-hundred-year event can become a once-in-a-ten-year event by the end of the century," he added.

With a 2°C increase in average temperatures, there is a 30% increased risk of significant deforestation in the northern forests of Eurasia, eastern China, Canada, and the tropical rainforests of central America and the Amazon. This risk would rise to 60% and affect wider areas if temperatures rose by 3°C. Other effects of higher temperatures include less freshwater and a greater risk of more intense droughts in west Africa, central America, southern Europe and the eastern states of America.

But one of the most dangerous scenarios depicted in the study involves land vegetation. "Terrestrial vegetation takes up CO_2; about half of what we emit is taken up by plants," Dr Scholze said. But when temperatures rise above 3°C, the absorbing effect of CO_2 by land plants is outweighed by the increase in organic decomposition within the soil, which increases with temperature. "We then see that we do not only have the carbon emissions from humans, but from the terrestrial biosphere as well," Dr. Scholze warned.

Climate change on Earth, mostly recognized in the form of global warming, is obviously altering Earth's weather in a tricky to predict pattern that is already causing extinction of wildlife and displacement of human populations. It is abundantly evident that human activity has severely accelerated and aggravated the inevitable change of Earth's climate. Understanding the serious effects of the acute change of climate on Earth is just the first step in combating global warming; a luxury no more.

Glossary

(1) **Slash-and-burn** is an agricultural technique widely used since Neolithic times and which involves cutting and burning of forests or woodlands to create fields.

(2) A **Monsoon** is traditionally defined as a seasonal reversing wind accompanied by corresponding changes in precipitation; it is now used to describe seasonal changes in atmospheric circulation and precipitation associated with the asymmetric heating of land and sea.

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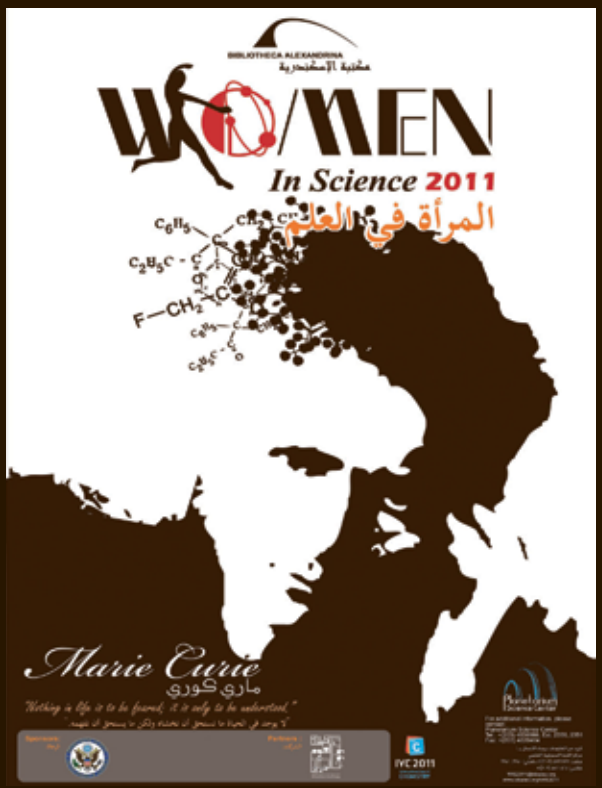
BIBLIOTHECA ALEXANDRINA
CELEBRATES WOMEN IN SCIENCE AGAIN (3-4 DECEMBER 2011)



To educate women is to educate the next generation. Not only are women a great human resource for any country, but because of their key role in the family, which is the building unit of the community, they set the standards for health and hygiene. Moreover, they form the majority of the agricultural labor force. Their role in society is thus critical for development.

In the world of globalization, more emphasis is being put on enhancing science and technology; a goal that could only be achieved through the mobilization of all human resources, a large portion of which is women. Girls should thus be encouraged to study scientific subjects, not just to pursue a scientific or technological career, but to be able to apply scientific concepts in their daily lives.

However, the role of women in the production and sharing of knowledge that contributes to improving people's economic status and quality of life has been limited. Moreover, the contribution of outstanding women in scientific research has not been fully recognized, resulting in inequity of access by women to the research professions.

To highlight the importance of the role of women, the Bibliotheca Alexandrina (BA) organized the first "Women in Science" conference in October 2007 (www.bibalex.org/wis2007). In collaboration with the Arab Network for Women in Science and Technology (ANWST), the BA celebrates "Women in Science" (WIS) for the 2nd time on 3–4 December 2011. The event also commemorates the centennial of Madame Curie's Nobel Prize in Chemistry.

The main aim of the conference is to empower women and encourage them to pursue a career in science and scientific research. Physicists and chemists from across the globe will gather to address the question of why so few women have followed in Marie Curie's footsteps in science. WIS 2011 will raise the public awareness of the importance of science and technology in general, and chemistry in particular given that 2011 was declared the International Year of Chemistry. Through the conference sessions, speakers will highlight the capacity of science to secure sustainable development and create new jobs. WIS 2011 is anticipated to discuss the new diversity and integration of sciences leading to new interventions and discoveries.

Keynote Speakers of the conference include Prof. Mostafa Elsayed, Director of the Laser Dynamics Lab at Georgia Institute of Technology, USA; Nina Fedoroff, Evan Pugh Professor at Huck Institutes of Life Sciences, Penn State University, USA; and, Zakya Kafafi, Program Director at the National Science Foundation, USA.

For more information, please visit the conference official website:
www.bibalex.org/wis2011

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Fact OR Fiction

By: Lamia Ghoneim

You must drink 8 glasses of water daily; cell phones can cause brain cancer; people only use 10% of their brains; chewing gum takes seven years to digest. Statements like these are very popular, people go around repeating them and often believing them, but how true are they and is there any scientific proof behind them?

You Must Drink Eight Glasses of Water Daily

Ding, Ding, Myth Alert!

Virtually, every health-conscious person can quote this recommendation. There is no denying that water is good for you, but does everyone really need to drink 64 ounces or more every day?

According to Heinz Valtin, a retired professor of physiology from Dartmouth Medical School who specialized in kidney research and spent 45 years studying the biological system that keeps the water in our bodies in balance, the answer is no.

Valtin says that for people who have specific health concerns, such as kidney stones or a tendency to develop urinary tract infections, drinking lots of water can be beneficial. But after an extensive search in 2002 for the origins of what is commonly referred to as the "8x8" guideline and a review of associated health claims, he reports finding no scientific evidence supporting the notion that healthy individuals need to consume large quantities of water.

In fact, Valtin found that the "8x8" guideline may have originated from a misunderstanding. In 1945, the Food and Nutrition Board, now part of the National Academy of Sciences's Institute of Medicine, suggested that a person consume one milliliter of water for each calorie of food. The math is pretty simple; a daily diet of around 1,900 calories would dictate the consumption of 1,900 milliliters of water, an amount remarkably close to 64 ounces. But many dieticians and other people failed to notice a critical point; namely, that much of the daily need for water could be met by the water content found in food.

So how much water should you drink? If you have specific medical concerns, talk to your doctor. But if you are healthy, it is recommended that you "have a beverage with meals and drink when you are thirsty".

Cell Phones Can Cause Brain Cancer

Should you be worried about that mobile plastered to your ear? According to a recent report by the WHO (World Health Organization), the answer is yes, you should.

Over the last few years, there has been mounting concern about the possibility of adverse health effects resulting from exposure to radiofrequency electromagnetic fields, such as those emitted by wireless communication devices. Although the argument that cell phones can cause cancer has been around long, until recently, evidence supporting the claim has been slim. Many scientists insisted that the pervasive technology was safe; testifying that "Its effect on the body appears to be insufficient to cause genetic damage".

However, on 31 May 2011, the WHO announced that cell phones indeed pose a significant risk of causing cancer. Cell phones are now labeled under "carcinogenic hazard", just like lead and chloroform.

Since cell phones are a relatively new technology, the report warns it could take years before the long-term effects are truly known. One study of past cell phone use, showed a 40% increased risk for glioma, a type of tumor that starts in the brain or spine, in the highest category of heavy users with a reported average of 30 minutes per day over a 10 year period.

Those results, among others analyzed by the WHO, were enough to earn cell phones a "2b classification", meaning there is some risk for cancer. Bottom line is, it is best to cut back on cell-phone usage, and when talking for long periods, it is recommended to use a hands-free device or opt for texting instead. After all, better safe than sorry.

People Only Use 10% of Their Brains

Ding, Ding, Myth Alert!

Though an alluring idea, the "10% myth" is so wrong it is almost laughable, says Barry Gordon, neurologist at Johns Hopkins School of Medicine in Baltimore. Although there is no definitive culprit to pin the blame on for starting this legend, the notion has been linked to the American psychologist and author William James, who argued in *The Energies of Men* that "We are making use of only a small part of our possible mental and physical resources".

The myth's durability, Gordon says, stems from people's conceptions about their own brains; they see their own shortcomings as evidence of the existence of untapped gray matter, which is a false assumption. What is correct, however, is that at certain moments in anyone's life, such as when we are simply at rest and thinking, we may be using only 10% of our brains.

"It turns out though, that we use virtually every part of the brain, and that [most of] the brain is active almost all the time," Gordon adds. "Let us put it this way: the brain represents 3% of the body's weight and uses 20% of the body's energy."

Although it is true that at any given moment all of the brain's regions are not concurrently firing, brain researchers using imaging technology have shown that, like the body's muscles, most are continually active over a 24-hour period. "Evidence would show over a day you use 100% of the brain," says John Henley, a neurologist at the Mayo Clinic in Rochester. Even in sleep, areas such as the frontal cortex, which controls things like self-awareness, or the somatosensory areas, which help people sense their surroundings, are active, Henley explains.

Chewing Gum Takes Seven Years to Digest

Ding, Ding, Myth Alert!

A myth as durable as gum itself holds that the chewy confection sticks to your innards like it does to the bottom of a desk. Rest assured though that this decades old bit of folklore, of unknown origin but almost universal renown, has in fact very little basis fact. Asked if the rumor is medically unfounded, pediatric gastroenterologist David Milov of the Nemours Children's Clinic in Orlando, replied: "I can tell you that with complete certainty".

If the legend were true, Milov says, "that would mean that every single person who ever swallowed gum within the last seven years would have evidence of the gum in the digestive tract", but colonoscopies and capsule endoscopy procedures turn up no such evidence. "On occasion we will see a piece of swallowed gum", he says, "but usually it is not something that is any more than a week old".

So what does become of gum that has been chewed up but not spit out? Not much, as it happens. Some of the components, such as sweeteners, are broken down, but the gum's base is largely indigestible. Chewing gum "is pretty immune to the digestive process", Milov says. "It probably passes through slower than most foodstuffs, but eventually the normal housekeeping waves in the digestive tract will sort of push it through, and it will come out pretty unmolested".

Nevertheless, the usually safe passage of gum through the system does not mean it is wise to habitually swallow it. Chronic gum swallowing can cause constipation and in rare cases may cause gastrointestinal blockage that requires extraction.

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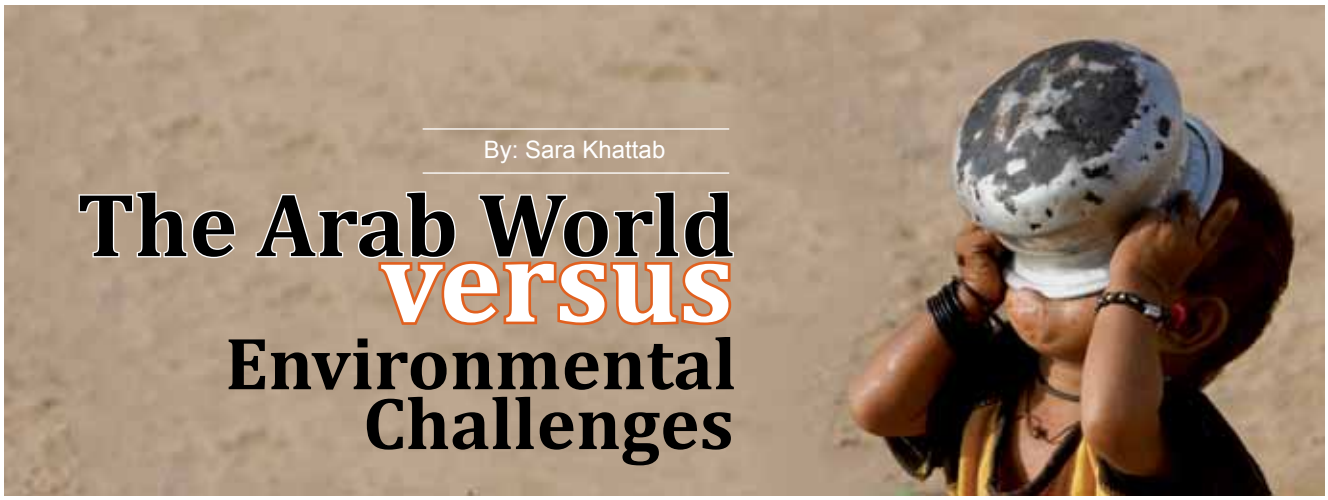


By: Sara Khattab

The Arab World versus Environmental Challenges

Today, the entire world faces unique and daunting environmental challenges. These include climate change, an emerging global crisis in water resources and water pollution, record loss of biodiversity and long-term damage to ecosystems, atmospheric pollution, waste production and disposal, impacts of chemical use and toxic substance disposal, damaged aquatic ecosystems, deforestation, land degradation, and the list goes on and on.

The Arab region is by no means an exception; in fact, it faces growing environmental stresses resulting from an exploding population, grave water shortages, desertification and overexploitation of land, atmospheric pollution, and of course, climate change. Potential conflicts originating in competition for dwindling natural resources may heavily strain relations among communities, populations and States.

The Arab region is home to 5% of the world's population; according to UN estimates, Arab countries will be home to some 395 million people by 2015, compared to about 317 million in 2007, and 150 million in 1980. The Arab population growth rate is 1.9%, which is higher than the average world rate of 1.2%. In a region where water and arable land are shrinking, population growth at these increasing rates places intensifying pressure on the capacity of Arab countries' lands, and further threatens environmental sustainability.

The Impending Water Crisis

As a result of human population growth, the availability of fresh water has become an increasingly significant concern in many parts of the world. The per capita water supply on Earth has reduced from 33,300 m^3 per year in 1850, to 8,500 m^3 in 1993. By the middle of this century, it is anticipated that nearly 65% of the world's population may experience water stress or even scarcity.

The Arab region represents 10% of the world's surface; however, it possesses only 0.5% of world renewable fresh water resources. This is due to the fact that arid and semi-arid[1] weather dominates 82.2% of the whole region. Rainfall precipitation is estimated to be 2,228 billion m^3; losses, however, amount to 90.4% due to evaporation. About 16% of the region's population thus lacks safe water.

According to hydrologists[2], if the annual per capita fresh water availability of a country is below 500 m^3, the country reaches the category of "absolute water scarcity". After crossing this mark, the country is almost certain to face inherent water deficit problems, which may threaten public health and socio-economic development. The most seriously affected Arab countries are: Bahrain, Jordan, Kuwait, Libya, Oman, Qatar, Saudi Arabia and United Arab Emirates.

Stressed groundwater systems are often the only source of fresh water in the region, yet it renews much more slowly than other water sources. On average, groundwater is renewed only once every 1400 years. Thus, groundwater has to be used in an environmentally sustainable manner; this means that the rate of withdrawal should be equal or less than the rate of recharge. Trans-boundary conflicts, poor distribution and heavy use, especially of ground resources, characterize water use in many Arab countries. This leads to lack of clean water for majority of the population, in addition to the waste of significant amounts in agriculture, industry and tourism.

Pollution is another main reason for the increase of water shortage in Arab countries; water pollution in Arab countries has indeed grown into a serious challenge. It is mainly attributed to contamination by fertilizers and pesticides, dumping of municipal and industrial wastewater into rivers and lakes, solid waste deposits along river banks, and uncontrolled seepage from unsanitary landfills. All these factors are degrading freshwater resources and imposing health risks, especially for children, the primary victims of waterborne diseases.

Desertification haunts the Region

Desertification is "land degradation in arid, semi-arid, and dry sub-humid areas resulting from various factors, including climate change and human activities."

The total area of the Arab Region is about 14•2 million km^2; 90% of it lies within arid, semi-arid and dry sub-humid areas. The area is characterized by harsh environment, fragile ecosystems and limited water resources and arable land.

Land degradation in the Arab Region is widespread and is proceeding at accelerating rates due to some factors; such as, water shortage, which may force farmers to use inappropriate irrigation practices leading to an increase of salinity in the soil, making it unproductive. Poverty and lack of high technologies prevent the Arabs, in some areas, from investing in land maintenance and rehabilitation.

Growing populations and overgrazing can also increase pressure on fragile land resources. The rapid increase in population, considered among the highest worldwide, along with the changing of consumption patterns and lifestyles, resulting in increasing food demand, have hastened land degradation in this arid environment. By the end of this century, and in spite of national, regional and international efforts to combat desertification and mitigate the effect of drought, desertification is considered one of the major environmental problems in the region.

A Region Heating Up

Though Arab countries are the most vulnerable countries to the projected impacts of climate change, air pollution receives far less attention among Arab countries than issues of water scarcity, although it now receives more attention than it used to. In fact, Arab countries generally exhibit higher levels of emissions than other countries, particularly oxides of nitrogen and volatile organic compounds. Ironically, when problems are most severe, where emissions and vehicle densities are highest, governmental response capacity is lowest, and growth is fastest.

Global warming is actually one of the most serious challenges facing us today. Under the projected climate changes, many parts of the planet will become warmer. Droughts, floods and other forms of extreme weather will become more frequent, threatening food supplies, economic assets, and human lives. Plants and animals that cannot adapt to the changed weather conditions will perish. Sea levels are also rising and will continue to do so, forcing millions of people in coastal zones to migrate inland.

Scientists are beginning to recognize climate change as an emerging risk factor for human health as well. Human health would be adversely affected by higher temperatures, mainly due to changes in geographical ranges of disease vectors such as mosquitoes, waterborne pathogens, water quality, air quality and food availability and quality.

The spread of vector-borne infectious diseases, such as malaria and schistosomiasis, is one the most alarming outcomes of rising temperatures. Malaria, for instance, which infects about 3 million people in the Arab region each year, may become more prevalent as higher temperatures reduce the disease's incubation period, spread the range of malaria-bearing mosquitoes, and increase mosquito abundance.

Moreover, global warming aggravates the impact of heat waves on public health, especially in Arab countries with their hot summer climates. Heat waves are projected to become more intense, frequent, and prolonged due to climate change. A number of studies in the region have researched heat-related mortality rates, and have consistently found a significant association between temperature and mortality.

Our Home Going Under

Middle East towns and cities could be hit by rising sea levels through global warming, displacing millions of people. The past century has witnessed a 17cm rise in sea level, at a rate of 1.75mm per year. Without any doubt, sea level rise is a global threat. With varying predictions on the extent of sea level rise, based on different variables that cannot all be foreseen, there is a near consensus on the need to apply precautionary principles to global warming.

In the Arab region, locations that occupy low-lying areas, such as deltaic plains, will face even more serious problems due to sea level rise. River deltas are particularly vulnerable, since increases in sea level are associated with land subsidence and human interference, such as sediment trapping by dams.

In the Arab world, the two major deltaic areas are that of the Nile River in Egypt, and the Tigris and Euphrates in Iraq. These locations are highly populated areas and among the most important agricultural lands in the region, which are located in low-lying coastal areas.

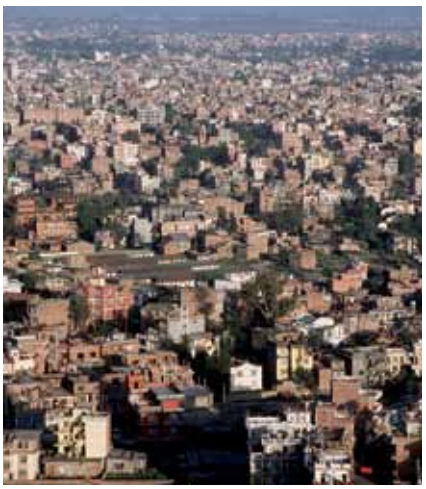
To Top it All: Possible Hunger

Food security in the Arab world has long been subject to environmental and socio-economic pressures. The dominant arid conditions, limited water resources, erratic cropping patterns, intensive grazing, population growth, and low knowledge and technology levels all affect food production systems in the region.

The dominant agricultural system in Arab countries is rain-fed agriculture; annual agricultural productivity and food security are highly correlated to the annual variability of precipitation. Projected climate changes may thus have disastrous effects on agricultural production in the region.

As a number of studies have shown, increased temperatures lead to much higher water needs in summer crops. Water scarcity in the Arab region is projected to increase rather than decrease; and therefore agriculture, and in turn the Arab region's food security, is highly vulnerable to climate change, with the risk of 50% decrease in food production if current practices continue.

As a solution to this critical problem, crop varieties, fertilizer, irrigation and other water management practices should be altered, as necessary, in light of climate change vulnerabilities.



Arab countries face serious threats to their environmental sustainability. There are strong reasons to believe that if these threats are not effectively managed, broad social and economic harm will result. Likewise, there is reason to believe that countries that do effectively manage these challenges will reap benefits including improved competitiveness.

Glossary

(1) **Arid and semi-arid:** an arid area is a place that lacks moisture; has insufficient rainfall and water to support the growth of trees and plants. Whereas a semi-arid area is a place characterized by relatively low annual rainfall, and has short grasses and shrubs; not completely arid.

(2) **Hydrologist:** a person who studies the properties, distribution, and effects of water on the Earth's surface, in the soil, and underlying rocks, and in the atmosphere.

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The Arab Environment Day celebration

By: Nihal Soliman

The Bibliotheca Alexandrina (BA) intends to soon start celebrating the annual Arab Environment Day (AED), the objective of which is to bring together Arab youth to share and exchange ideas, and collaborate in facing regional environmental challenges.

AED will also raise public awareness and stimulate decision makers and stakeholders to join hands in facing the degradation of the region's biodiversity and its negative impact on sustainable development. The environmental and cultural activities are expected to boost the Arab identity and increase the sense of solidarity among young generations.

In recognition of the importance of preserving the global ecosystem, the UN initiated the World Environment Day (WED) in 1972. The Planetarium Science Center (PSC) has celebrated WED since 2007; the annual festivity stimulated awareness with environmental issues and celebrated positive environmental action.

In commemoration of the First Conference for Arab Environment Ministers and Officials in Tunisia on 14 October 1986, the Arab Environment Day celebration was announced. Every year, the Arab League adopts an environmental slogan to raise public and decision makers' awareness of an environmental issue. The celebrations are designed to garner Arab solidarity to solve common problems.

The BA plans to make its first AED festivity a big celebration, building on the unprecedented success of WED 2010. The PSC will also utilize the BA infrastructure and networks to attract as many Arab countries as possible to join the celebrations to maximize the day's regional positive impact.

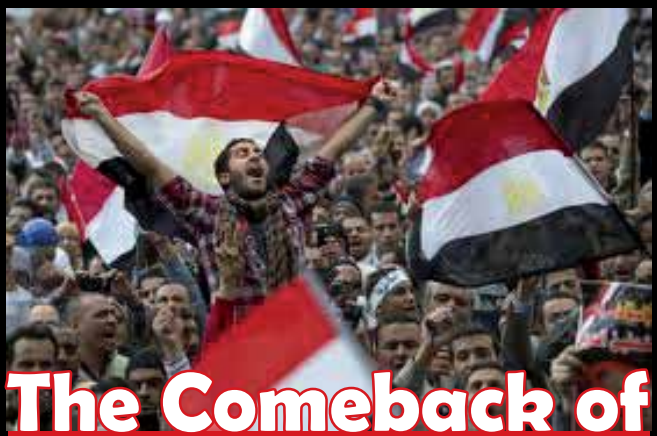
As Founding Member of the North Africa and the Middle East Science centers Network (NAMES), the PSC will be inviting fellow NAMES members and other science communication institutions from all over the region to join in celebrating AED.

The PSC will announce an environmental challenge as an overarching theme for the day's activities, which will target high school students who will compete in contests to find solutions for the challenge. Arab teams will compete with projects that will be displayed for the public on the first day of the event and judged on the second day.

A village will be set up on the BA plaza to host the environment-friendly science fair. Concurrent cultural and entertaining events, in addition to a spectacular closing ceremony, are also planned to take place.

The AED environmental village will be divided into zones, one of which is the Activities Zone divided into five sections where visitors take simple quizzes to answer as they proceed from one section to another. Upon finishing their tour and presenting their answers, prizes will be distributed to winners every hour.

The Exhibition Zone comprises an outdoor environmental exhibition presented by Arab contestants showcasing the contest's output of diverse products. As for the Community Zone, it will be divided into 12 booths occupied by partners, sponsors, NGOs and industry representatives to showcase practical contributions to Mother Nature.



The Comeback of POLITICS

By: Lamia Ghoneim

After decades of political suppression, our country is nowadays thriving with colorful political discussions and lively opinion debates. We Egyptians are finally, and for the very first time, able to speak freely and candidly about our political beliefs and principles; enthralled with the knowledge that our opinions matter, and that each and every one of us has the opportunity to influence important decisions that will shape the course of our lives and restore the greatness of our beloved country.

With the events of the epic revolution alive in our memories, the whole nation is talking politics. The involvement of ordinary people in political activity is one of the most pronounced changes that have occurred in our society. One could even call it a phenomenon; the comeback of politics.

We suddenly find ourselves bombarded with intricate political terminologies. For the average person, such talk is bound to get confusing. Yet, an extraordinary thirst for political knowledge and understanding has grown in each and every one of us, and a sense of responsibility has developed in us as we all now fight for "freedom, social justice and human dignity".

This newfound sense of responsibility, along with the desire for knowledge, is what we need to carry us into the next era of Egyptian history. With many crucial political choices ahead, it is our duty to understand the branch of science that deals with everything political; political science.

THE SCIENCE IN POLITICAL SCIENCE

The systematic study of governance by the application of experimental and generally scientific methods of analysis is known as Political Science. It is a social science concerned with the theory and practice of politics, and the analysis of political systems and political behavior. Political scientists engage in revealing the relationships underlying political events and conditions; from these revelations, they attempt to construct general principles about the way the world of politics work.

Although, like all modern sciences, political science involves practical investigation, it generally does not produce precise measurements and predictions. However, if the term science applies to any body of systematically organized knowledge based on facts ascertained by experiential methods, and described by as much measurement as the material allows; then, political science is indeed a science.

DEMOCRACY AND THE CONSTITUTION

Of the terms intensively articulated in slogans and chanted during the revolution and after, democracy has been one of the most common. While we all know we desire it, the precise meaning of the word and what it exactly entails maybe unfamiliar to us.

Democracy literally means rule of the people; in practice, it is a type of political system characterized by majority rule. It is a form of government in which all citizens have an equal say in the decisions that affect their lives. Ideally, this includes equal, and more or less direct, participation in the proposal, development and passage of legislation into law.

Democracy has taken a number of forms, both in theory and practice; there are two major forms of it:

(1) ***Direct Democracy:*** government by the people; a form of government in which the supreme power is retained and directly exercised by the people.

(2) ***Representative Democracy:*** government by popular representation; a form of government in which the supreme power is retained by the people, but is indirectly exercised through a system of representation and delegated authority periodically renewed, such as a constitutional representative government.

While there is no specific, universally accepted definition of "democracy", equality and freedom have both been identified as important characteristics of democracy since ancient times. These principles are reflected in all citizens being equal before the law and having equal access to legislative processes. For example, in a representative democracy, every vote has equal weight, no unreasonable restrictions can apply to anyone seeking to become a representative, and the freedom of its citizens is secured by legitimized rights and liberties, which are generally protected by a constitution.

The democratic system is the contrast of a dictatorship "autocratic" system, where one self-appointed ruler holds all the power and is likely to become a tyrant. However, in a democratic system, it is also possible for a minority to be oppressed by a "tyranny of the majority" in the absence of governmental or constitutional protections of individual and/or group rights. For that reason, most modern standard governments today are republic or democratic republic, where the majority is limited and constrained by a written constitution that protects the rights of the individual and the minority.

The constitution is the body of doctrines and practices that form the fundamental organizing principle of a political state. The constitution of a nation is its supreme law, wherefrom the powers of government are derived and wherein the rights of the citizens of that nation are outlined.

The first constitution ever to be propagated in Egypt is the 1882 constitution. The outcome of the Orabi Revolution, it sought to reorganize the election of delegates for the National Assembly and to restrict the authority of the Khedive.

Most constitutions seek to regulate the relationship between institutions of the state; basically between the executive, legislature and judiciary.

THE SEPARATION OF POWERS

The **executive** branch of government is the part of government that has sole authority and responsibility for the daily administration of the state bureaucracy.

A **legislature** is a kind of deliberative assembly with the power to pass, amend, and repeal laws. The law created by a legislature is called legislation or statutory law. In addition to enacting laws, legislatures usually have exclusive authority to raise or lower taxes and adopt the budget and other money bills. Legislatures are known by many names, the most common being parliament and congress.

The **judiciary** is the system of courts that interprets and applies the law in the name of the state; it also provides a mechanism for the resolution of disputes. Under the doctrine of the separation of powers, the judiciary generally does not make law, which is the responsibility of the legislature, or enforce law, which is the responsibility of the executive, but rather interprets law and applies it to the facts of each case.

The minimal definition in institutional terms of constitutional democracy is that it should provide a regularized system of periodic elections with a free choice of candidates, the opportunity to organize competing political parties, decisions made by majority vote with protection of minority rights, an independent judiciary, constitutional safeguards for basic civil liberties, and the opportunity to change any aspect of the governmental system through agreed procedures.

PRESIDENTIAL VS. PARLIAMENTARY

Controversy abounds over the future of Egypt's political system. Some defend the idea of a parliamentary system; while others insist that, at this particular time, this system would be chaotic and ineffective, and are hence in favor of a presidential system.

By definition, **presidential systems** constitute three basic features. First, the President originates from outside the legislative authority; in most countries, presidents are elected directly by the citizens. Second, the President serves simultaneously as Head of Government and Head of State; he is empowered to select cabinet ministers, who are responsible to him and not to the legislative majority. Finally, the President has some constitutionally guaranteed legislative authority.

The powers invested in the President are usually balanced against those vested in the legislature. In the American presidential system, the legislature must debate and pass various bills. The President has the power to veto the bill, preventing its adoption; however, the legislature may override the President's veto if they can muster enough votes.

In **parliamentary governments**, the Head of State and the Chief Executive are two separate offices. Many times the Head of State functions in a primarily ceremonial role, while the Chief Executive is the head of the nation's legislature.

The most striking difference between presidential and parliamentary systems is in the election of the Chief Executive. In parliamentary systems, the Chief Executive, known as the Prime Minister, is not chosen by the people but by the legislature; typically chosen by the majority party in the parliament. However, in some parliaments, there are so many parties represented that none hold a majority. Parliament members must thus decide among themselves who to elect as Prime Minister.

THE DIVISION OF CATEGORIZATION

The term "Liberal" is now frequently employed to describe many emerging political forces and newly formed parties as well as old ones, often accompanied by the word "Secular", and repeatedly used as opposing to the term Islamist.

Liberalism, from the Latin *liberalis* meaning "of freedom", is the belief in liberty and equality of rights. Liberals adopt a wide array of views depending on their understanding of these principles; most liberals support such fundamental ideas as constitutionalism, free and fair elections, free trade and the freedom of religion.

Secularism is the belief that government or other entities should exist separately from religion and/or religious beliefs. In one sense, secularism may assert the right to be free from religious rule within a state that is neutral on matters of belief. In another sense, it refers to the view that human activities and decisions, especially political ones, should be unbiased by religious influence.

On the other hand, **Islamism** or "Political Islam" is a set of ideologies holding that Islam is not only a religion but also a political system. It was also defined as "the Islamic ideology that guides society as a whole and teaches that law must be in conformity with the Islamic Shari'a".

Socialism, also known as Leftism, is another term that has re-emerged and is used frequently nowadays in conjunction with social justice. The term is used to describe any of various economic and political philosophies that support social equality, collective decision-making, distribution of income based on contribution, as well as public ownership of productive capital and natural resources.

In reality, the meaning of those terms is quite broad, and is widely different from one person to another. A person who classifies himself, or is classified by others, as "Liberal" may not believe in all the teachings of liberalism; likewise, a person who is classified as "Islamist" may actually think quite differently from another who classifies himself as such.

THE CIVIL STATE DEBATE

A much more consuming debate is one of, if not the most pressing political issue in Egypt since the revolution; the "civil state" debate. Defenders of the civil state argue for the separation of religion and politics fearing theocracy; opponents, on the other hand, fear secularism, which in their opinion would abolish the country's conservative identity.

The civil state, as defined by its advocates, is a citizen state where all citizens are equal regardless of gender, religion, ethnicity or social status. It is a country of equal opportunities and equality under the law. It contrasts with a "military state" in the sense that it is ruled by civilians; it also severely contrasts with a "theocratic state" in the separation of religion and politics. Rulers of the civilian state are only regarded as a political power and must answer to the people and obey the law.

Theocracy, on the other hand, is a form of government in which a state is ruled by clergy, or by officials who are regarded as divinely guided. Such state was the common state in Medieval Europe and in Ancient Egypt. It should be distinguished from other forms of government that have a state religion, or are merely influenced by theological or moral concepts.

Struggles between different political forces can be beneficial for democratic transformation. They help foster a healthy political atmosphere that encourages vigorous debates where all sides are held accountable for their claims; a system of political checks and balances. However, arguments and differences in opinion between separate political parties must not lead to the loss of solidarity between people who are all citizens of the same flag, who share the love of a great nation, and are united under the same cause.

Throughout the Egyptian Revolution of 25 January 2011, we discovered the invincibility of unity; the euphoria of this unity was what pulled us through and what we need to pull us through the challenges to come. It is true that the road ahead is long and hard, but the heart of the revolution, the younger generation and their dreams for themselves and their children, has not stopped beating. Egyptians remain committed to the goals of their revolution for which many martyrs lost their lives.

Today, unlike any other day ever before, we Egyptians sport the collective glow of dignity and accomplishment, and continue to be driven by a mission to reclaim and restore our country; to build a new Egypt that is ours to be proud of.

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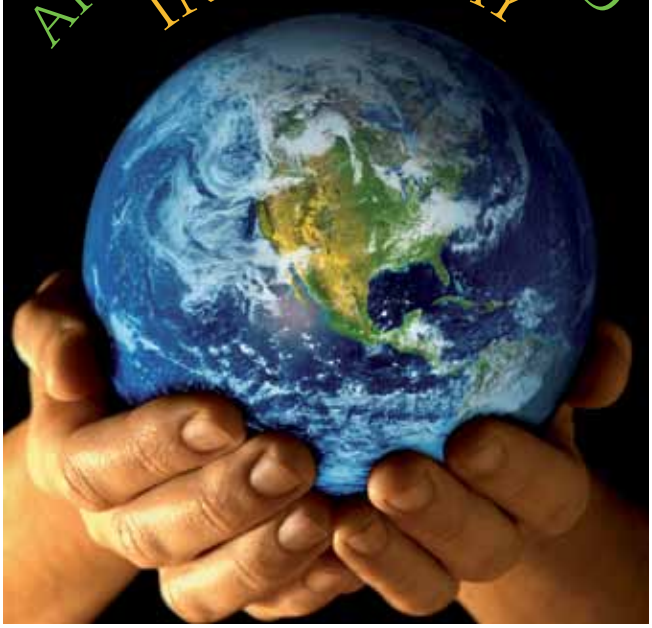
By: Aisha Hassanein

AROUND THE WORLD IN ONE DAY



It is true that the world has become a small village thanks to technology. More than that, with the fastest airplane, the X-43A, now reaching nearly 12,000 km per hour according to NASA, it is not inconceivable that soon one could have breakfast in France, lunch in South Africa and dinner in Japan. The thought makes one wonder how trotting around the globe in one day would feel like.

How Lost was the Lost City?

I can imagine our journey starting at 5:30 am. We wake up in the small Peruvian village of Aguas Calientes; early enough to make the first bus that will take us up a mountain range like no other, to the "Lost City" of Machu Picchu. Only at 7:30 am, when the Sun starts rising from behind the mountains and the first rays hit the well-preserved ruins of Machu Picchu, clinging to the steep hillside and surrounded by towering green mountains overlooking the Vilaconta River Valley, and we take that deep breath that follows a moment of awe-struck silence, only then do we understand how this marvel was lost to the world only to be discovered in 1911. What a perfect start for the day.

On the morning of 24 July 1911, a lecturer-cum-explorer from Yale University set off in a cold drizzle to investigate rumors of ancient Inca* ruins in Peru. The explorer chopped his way through thick jungle, crawled across a bridge of slender logs bound together with vines, and crept through underbrush hiding venomous vipers. With a small Indian boy leading the way, Hiram Bingham stumbled upon one of the greatest archaeological finds of the 20th century: Machu Picchu.

Machu Picchu is formed of buildings, plazas and platforms connected by narrow lanes or paths. One sector is cordoned off by walls, ditches, and perhaps, a moat built not as a military fortification, but rather as a form of restricted isolation. Modern theory suggests that Machu Picchu was a retreat built for the Inca ruler Pachacuti and other elites. Nestled more than 2 km above sea level in the Andean Mountain Range above the Urubamba Valley, it is not surprising this wonder was lost to the world for centuries.

*The Inca Empire flourished on the West Coast of South America between the 13th and the 16th centuries.

To Breakfast, or not to Breakfast!

Having fed our soul with peace and beauty, we hop onto the plane to feed our hungry stomachs at our next destination; and because we can, we go for the best breakfast that the planet has to offer in Paris, France. Standing there, on 8, rue Monge in the 5th arrendissement, is the best bakery in Paris. To call it a bakery does not give it justice for Eric Kayser is truly an Artisan Boulanger. The croissants simply melt in our mouth; as we savor the subtle buttery flavor of every bite of this piece of art, we start dreaming of the cakes and tarts that are on display, but let us not leap ahead of ourselves, the day is just starting, and the planet has much more to offer.

Your mother is right; breakfast really is the most important meal of the day. Not only does it give you energy to start a new day, but breakfast is linked to many health benefits, including weight control and improved performance.

Eating breakfast is important for everyone, but is especially so for children and adolescents. According to the American Dietetic Association, children who eat breakfast perform better in the classroom and on the playground, with better concentration, problem-solving skills, and eye-hand coordination.

On the other hand, many studies, in both adults and children, have shown that breakfast-eaters tend to weigh less than breakfast-skippers. Why? One theory suggests that eating a healthy breakfast can reduce hunger throughout the day, and help people make better food choices at other meals. While it might seem you could save calories by skipping breakfast, this is not an effective strategy. Typically, hunger gets the best of breakfast-skippers, and they eat more at lunch and throughout the day.

However, it is worth noting that most studies linking breakfast to weight control and weight loss looked at a healthy breakfast containing protein and/or whole grains; not meals loaded with fat and calories. Adding a little lean protein to your breakfast may be just the boost you need to help keep you feeling full until lunchtime. "Protein blunts your hunger the most, and is the most satiating," Purdue University Researcher Wayne Campbell, PhD, tells WebMD.

Adrenaline Addict Anonymous

Buzzing with energy after a hearty breakfast, we board our jet to our next destination, the highest and largest bridge in South Africa, the Bloukrans Bridge, to do nothing more than jump from it!

The Bloukrans Bridge is the highest single span concrete bridge in the world, and most importantly, the highest Bungee Jump Bridge in the world. We are secured into a full body harness, and with every step we take on the catwalk our heart beats faster and faster. We take our place at the top of the arch and hear the countdown to our biggest adventure to date. Just as we thought our heart could not beat any faster, we hear the instructor yell "jump" and we take the bravest leap of our life, plunging 216 m towards the flowing waters of the Bloukran River. Hanging there in the depth of the Bloukran's River Valley, we smile.

Adrenaline, also known as epinephrine, was the first hormone to be identified in 1904. The human body has two adrenal glands, one on top of each kidney; these glands form part of the endocrine system, which works in conjunction with the nervous system and the immune system to help the body cope with different events and stresses, such as high intensity workouts, fatigue and especially life-endangering situations.

When released into the bloodstream, epinephrine increases heart rate and blood pressure, dilates the pupils, elevates the blood sugar level, and redistributes blood flow away from the skin and inner organs. Adrenaline rushes are also described to give a feeling of a natural high, which is why some people try to actively push their bodies to achieve adrenaline rushes, to the point of addiction.

People who are excessive in their participation in exercise, sports, skiing, mountain climbing, car racing or flying airplanes become addicted to the adrenaline rush; they feel depressed when they do not reach it.

Spice Up Your Life

After toying around with the idea of having Sushi for lunch in Antarctica, we decide to go for a more explosive meal in India. Entering a home in India, each of our senses is engaged, from the bedazzling colors and intricate details of the designs on the walls and the furniture, to the smells of the oils and fragrances in the air.

We sit on the floor around the little table that gathers the whole family everyday, as is a sacred tradition in Indian homes. Knowing that a single Indian meal can contain between 10 and 100 different spices, we brace ourselves for the journey our taste buds are about to embark upon. Surely enough, a festival of tastes explodes in our mouths; a perfect marriage of sweet, sour, savory, spicy, oaky and other tastes we cannot put into words, all in one spoonful. A true representation of everything that is Indian.

Herbs and spices have more disease-fighting antioxidants than most fruits and vegetables. To start with, among countless benefits, garlic destroys cancer cells, says Karen Collins, nutrition advisor to the American Institute for Cancer Research. "Studies suggest that one to two cloves weekly provide cancer-protective benefits." Moreover, a USDA study found that, gram for gram, oregano has the highest antioxidant activity of 27 fresh culinary herbs.

A popular spice, cinnamon can lower blood sugar, triglycerides, LDL, and total cholesterol in people with type 2 diabetes. Aim for one-fourth to one-half teaspoon of cinnamon twice a day. On the other hand, paprika contains capsaicin, whose anti-inflammatory and antioxidant effects may lower the risk of cancer, and which is also found in cayenne and red chili peppers. There is no specific recommended dose, but moderation is probably the best way to go.

Ginger can decrease motion sickness and nausea; may also relieve pain and swelling associated with arthritis. Doses used in clinical trials range from 500 mg to 2,000 mg of powdered ginger; more than 6,000 mg can cause stomach irritation. Ginger can also hinder blood clotting, so if you are about to have surgery or are taking blood thinners or aspirin, be sure to talk to your doctor first.

As for turmeric, it contains curcumin, which can inhibit the growth of cancer cells. "Try to have 500-800 milligrams a day," says Bharat Aggarwal, PhD, a professor of cancer medicine at the University of Texas M.D. Anderson Cancer Center. Moreover, rosemary stops gene mutations that could lead to cancer and may help prevent damage to the blood vessels that raise heart attack risk.

ZoomTech!

No day is perfect without new knowledge gained. For that, we venture almost 6,500 Km to the west to the epicenter of invention, Tokyo, Japan. Landing at Tokyo International Airport, we are greeted by the posters of Aimi Eguchi, a member of a Japanese pop band, that the public only recently discovered was a digital fake.

Shortly thereafter, we get acquainted with the concept of aidea shohin, meaning "idea products", which are unusual gadgets that would be convenient to own but are not practical enough for mass production. We see a mattress with a built-in fan that cools itself up for those warm nights, a vibrating alarm pillow that will wake you up without disturbing your partner's sleep, a talking piggy bank that tells the kind of coin just put in and how much saved, long-distance phone pet feeders, hands-free umbrellas, and so many more inventions that make us just a little bit dizzy.

Have you ever sat at your desk, at work, eating a cold sandwich and wondered what it would take to have a warm meal in the middle of your long working day? Well, Thanko, an innovative gadget shop in Akihabara, Tokyo's premier electronics district, may have the answer.

Thanks to Japanese ingenuity, there is now a computer-heated lunchbox available. This special lunchbox can heat up its contents by simply plugging it into the PC's USB port. It will keep any lunch well heated to be quite enjoyable even if it was prepared in the early mornings. Although it may not yet be available in Egypt, knowing that there is such a lunchbox available can be quite reassuring, especially if you often bring your own homemade lunch to the office.

The Perfect Sunset

Finally, for our final destination we take a short flight to the beautiful red deserts of Australia. As the Sun sets on this perfect day, we are embraced by the warmth of the red color in the sky and on the ground. The intense sandy smell in the warm Australian air, and the vast spaces around us provide us with the perfect contrast between feelings of total freedom and warm embraces. We reflect on the perfect day we have had and we look forward to many more like it.

The Red Australian Desert is named after its most striking characteristic; the reddest soils you are likely to ever have seen. Why is that? Why are the deserts in Egypt white, while those in Australia are red?

It is because of the climate. Soil is the product of rock erosion, which is caused by weathering. In climates such as Australia, the weathering is chemical; reactions like hydrolysis, hydration and oxidation are the cause of the red color, just like rust.

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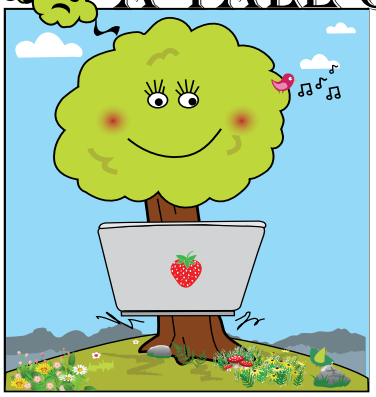
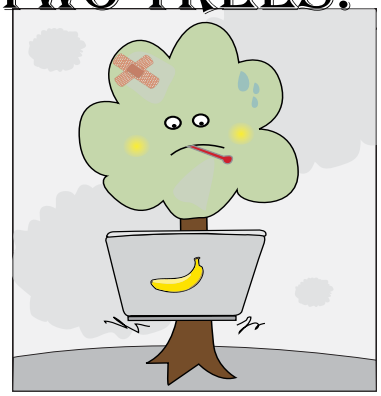
A TALE OF TWO TREES!

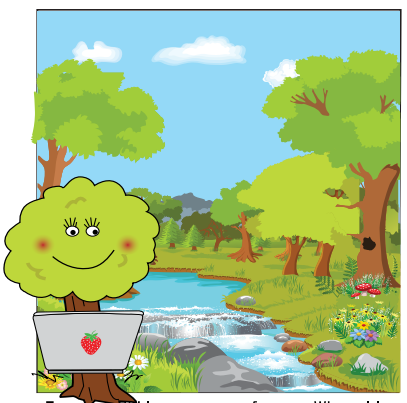


Foresty: Hi there. My name is Foresty; what is your name? Can we be friends?



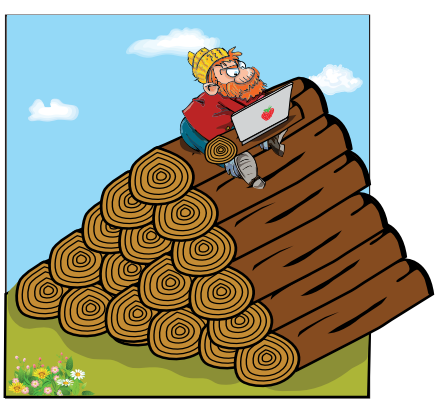
Citty: Yes, of course! I am Citty and I am always lonely

Citty: I can hardly find a family member or a friend, and I am always sick



Foresty: Oh! I am so sorry for you. Where I live, I am always surrounded with family and friends.

BOOOOOOOOOM



Lumberjack: HI CITTYY.....

Illustrations: Maha Sherin

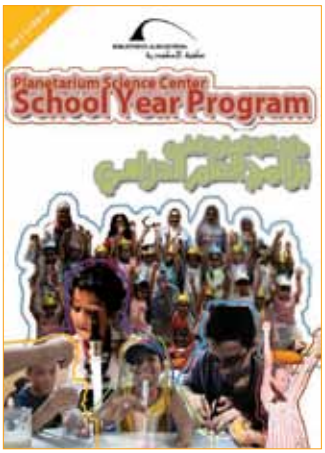
Phenomenon

Plants had and still have a key role in the history of life on Earth. Through the process of photosynthesis, green vegetation converts carbon dioxide and light energy into nutrients and oxygen, which is essential for all living organisms.

Nowadays, human activities have a great impact on the presence of trees and plants. The greater devastation takes place in forests and woodlands, where humans cut trees to make commercial use of wood and convert forests and woodlands into agricultural land to feed growing numbers of people and earn money.

The accelerating destruction of the rainforests that form a precious cooling band around the Earth's equator, is now recognized as one of the main causes of climate change. The rampant slashing and burning of tropical forests is second only to the energy sector as a source of greenhouse gases according to a report published by the Oxford-based Global Canopy Programme (GCP).

The GCP's report concludes: "If we lose forests, we lose the fight against climate change."



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