

No. 9, JUNE 2015



From **PLATON** To **DARWIN**:
**HOW DID THE THEORY OF
EVOLUTION DEVELOP?**

Logbooks and marine odysseys:

One hundred and five years of Jacques Cousteau

For & Against:

Student's opinions on euthanasia



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PREFACE

Those who truly have a passion always find a way to express it. Ours – the students of the Faculty of Biology and Geology – is the magazine Bio-ME, and it is our way of sharing our passion for science, information and research. Periodically, we try to offer our audience interesting articles containing topical issues and curiosities of the living world. Hence, we encourage those interested in pursuing their passion, because, above all, it vibrates in the hearts and minds of everyone.

The BIO-ME Team

OSpN and EARTH HOUR

*1st Year Biochemistry Student, Diana Galea,
Faculty of Biology and Geology,
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What does Earth Hour represent?

A first answer, one that everyone knows, would be that Earth Hour is a movement that is characterised by turning off lights, either individually, or by a community, or the whole society. The emergence of this action was due to the need for the global awareness of climate change. Therefore, the initiative to solve this problem as much as possible was started on the 31st of March, 2007 by WWF – Australia, who organised Earth Hour for the first an hour reached 2.2 million. That event remained in people's memory as Earth Hour.

Since then, Earth Hour is celebrated annually in the last Saturday of March, near the equinox, so that many cities would be in the dark between 8:30 PM and 9:30 PM. In the years that followed, Earth Hour was celebrated not only in Sydney but in many other cities, and the number of participants to this event has grown yearly. In 2008 there were 25 countries already, 370 cities and 50 million people who joined this movement. In 2010 the event reached 88 countries and 4.000 cities. The year 2011 involved 128 countries, 4.616 cities and a growing number of people aware of the need for an environment less threatened by climate change. In 2014 there were over 7.000 cities and today the event has over 2 billion supporters from over 162 countries.

The message remains the same: the problems caused by climate change and the massive consumption of various resources. Precisely because of this, in 2011 Earth Hour entered another stage called Beyond



the Hour, which involves turning off lights and, in addition to this, encouraging people to engage in environmental actions, and to change their civic behaviour from an ecological point of view.

Romania celebrates Earth Hour starting from 2009, initially with a number of only 9 cities. Later, however, namely in 2012, Bistrița, Timișoara and Satu-Mare won the titles of Earth Hour Capitals of Romania.

OSpN and Earth Hour

In 2015, Earth Hour was celebrated on the 28th of March. Being aware of this event and having the enthusiasm to engage in yet another successful project, the volunteers of the Students for Nature Organization (OSpN) began to meet, discuss various ideas and to develop an entire activity on account of this event. The bad weather didn't matter, and neither did the long hours of discussion. The enthusiasm of the volunteers and the determination to get involved was all that mattered. This attitude has led us to appeal to the City Hall of Cluj-Napoca and Cluj-Napoca 2015 - European Youth Capital



for taking the OSpN initiative to another level. Their response was positive.

So on March 28 we went to Piața Unirii (Union Square) to turn off street lighting and to mark it with 60+ candles, which represent the hour in which we commit to letting Earth breathe and spending time with friends, remembering to have fun with each other without letting any form of technology to intervene. At least, everyone present in Piața Unirii did exactly that. Even if the 28th of March didn't allow us to arrange a larger number of candles and to arrange a more visible text due to the wind, we had jars decorated by OSpN volunteers. A week before, they organized a creative workshop named "Pimp your Jar", where they brought many bags with jars in order to paint them as colourful as they could. Thus, on March 28 we managed to keep our candles lit so we could mark a 60+ in Piața Unirii. At the same time, the mood was

maintained by fire stunts and a spontaneous concert. The organization's artist, Vlad Vancea, had the inspiration to adapt some lyrics to fit the context: "...and yell Veta, you have saved the planet!"

Also on that day, at Cinema Mărăști there was a movie projection which fitted the theme, *The 11th Hour*. The impact and subsequent conclusions reached were significant and helped environmental awareness. Because the timing was as good as it could get, the next morning another considerable number of Students for Nature Organization volunteers participated in the afforestation event organized by CERT Transylvania, held in Baci forest.

Finally, it is clear that Earth Hour was not forgotten by Cluj-Napoca, and due to extraordinary and creative people, who were dedicated and involved in this, we managed to mark the event in an original and pleasant way, we realised the seriousness of the environmental situation, and we have also marked this celebration with cheerfulness, smiles and, especially, unique and beautiful memories.

We thank the volunteers involved in organising and participating in the events!



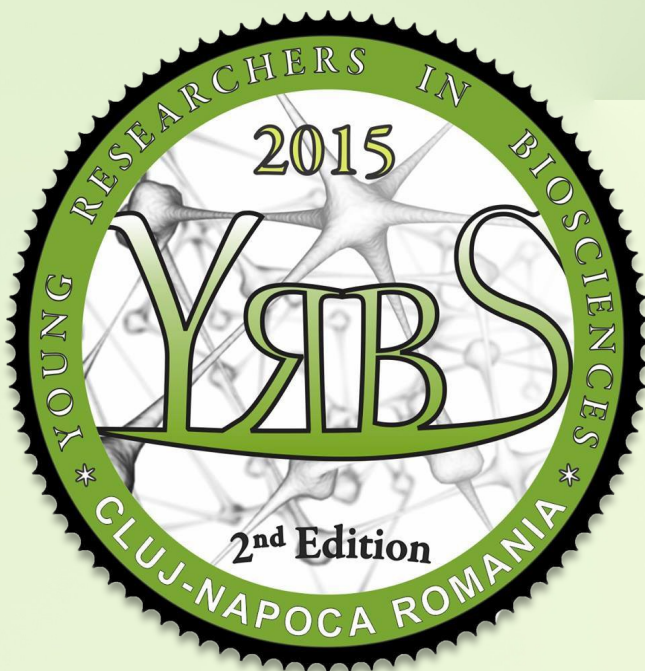
YRBS

*3th Year Industrial Biotechnology Student, Diana Felicia Bogdan,
Faculty of Biology and Geology,
Babes-Bolyai University, Cluj-Napoca*

Here we are at the second edition of the International Symposium „Young Researchers in BioSciences”, a symposium by which we want to bring together undergraduate or graduate students who work in the field of Bio-Sciences and want to share their work both in a formal and non-formal environment.

WHO can participate?

Anyone who is interested, works in the field of Bio Sciences and wants to share his/her work. By this, we want to create an international platform through which new generations of researchers can share their experience and research, trade ideas, and why not establish future collaborations in order to enhance scientific innovation from early career stages.



This year, the symposium will take place on 22-26 July, in Cluj-Napoca at the Faculty of Biology and Geology.

Also, we are preparing some surprises this year for participants because we want to make each edition a special one, not just "another symposium or conference attended".

The first edition, in fact, was the National Symposium "Young Scientists in Biological Sciences", held on 24-25 May 2013, followed by taking it a step further the next year, becoming an international

symposium.

Last year, there were over 30 participants, and in terms of geographical locations they came from Norway, Ukraine, Romania (Cluj-Napoca, Iași, Timișoara) and Moldova.

Regarding the theme of the presentations, both oral and posters, they have incorporated several areas of life sciences, which we wanted in order for everyone to find out something new in the area they are passionate about.

As we said, last year we had participants from Romania and also from Norway, Ukraine and Republica Moldova. The participants' thoughts about YRBS 2014 can be found on our official website: <http://www.yrbs.ospn.ro>

Also, in order to keep in touch with last year's participants, and also future ones, you can contact us on social media:

Facebook page: <http://www.facebook.com/YRBioSci>

Twitter: <http://www.twitter.com/YRBioSciences>

LinkedIn: <https://www.linkedin.com/in/YRBioSciences>

The organising team



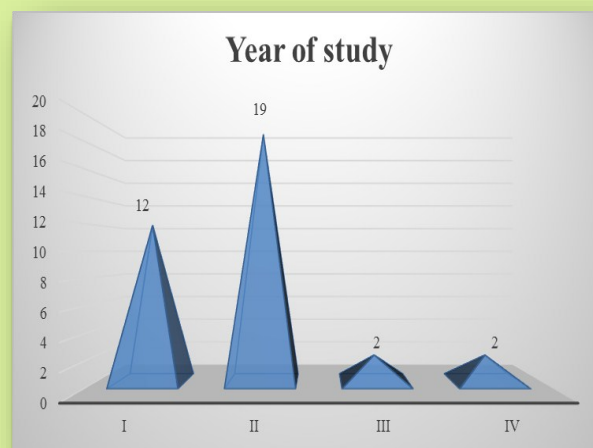
The Issue of EUTANASHIA

Student's opinions

*2nd Year Biology Student, Maria Adelina Milonean
Faculty of Biology and Geology,
Babeş-Bolyai University, Cluj-Napoca*

Since antiquity, when the word “euthanasia” (gr. *Eu* and *Thanatos*, meaning “good”, respectively “death”) was used for the first time by the roman historian Suetonius to describe the death of Caesar Octavius Augustus, the practice of – as considered – inducing an easy death to incurable or terminally ill patients has been a debated subject throughout human societies. Euthanasia was legalised for the first time in 1935 in Germany, and today it is regulated in other ten countries, including Canada, Switzerland, Japan, Belgium and the USA.

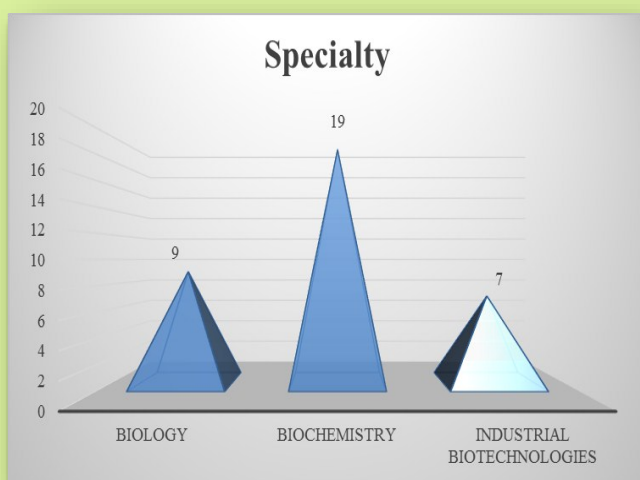
To find out students’ thoughts on the subject, chiefly those from the Faculty of Biology and Geology in Cluj-Napoca, we came up with a questionnaire that was completed by a total of 35 students from the Faculties of Biology and Geology in Cluj and Iaşi. The results and some of the answers are presented in the following pages of this article.



1.What does euthanasia mean to you?

A set of techniques used to end an organism’s life in the most worthy and painless way possible. Euthanasia, plainly speaking, means “good death” and is relevant especially in the area of painful and disturbing illnesses that are usually incurable.

(2nd Year Biochemistry Student, Harald Bârzan)



By euthanasia I understand the deliberate act of ending a patient’s life in order to stop his suffering, death being considered a benefit of the patient’s. Sadly, not only voluntary euthanasia is practiced, which takes place with the patient’s consent, but also involuntary human euthanasia, which happens against the patient’s will, or passive human euthanasia which happens by taking away the patient’s treatment.

(1st Year Biochemistry Student, Florian Raula)

By euthanasia I understand a method to cause death, in the case in which this can end the suffering of some individuals, both mental suffering as well as emotional.

(2nd Year Biology Student, David Jelescu)

The induction of death by chemical means in the case in which the patient consents to this, or an empowered person does, if the patient is not capable.

(2nd Year Biology Student, Lia-Raluca Olari)

Euthanasia is a medical method to end the life of a suffering patient, when the person agrees to this decision and is completely mentally sane.

(1st Year Biochemistry Student, Renata Hajdu)

A medical method through which a man with an incurable illness is killed without suffering.

(2nd Year Biochemistry Student, Bogdan Damaschin, Alexandru Ioan Cuza University, Iași)

2. Opinions of students who are pro euthanasia

I believe that just as the right to live, the right to die is a fundamental right of the human being. In other words, if an individual wants to die, they should be allowed to. I think that in the case in which an individual decides they want to be euthanized, there should be a program of psychological counselling, through which once can try the emotional curing of the person in question; but if the person still wants to be euthanized, it should be their right to do so. I believe that not allowing a person to ditch existence is just as bad as not allowing them to live. As far as people who cannot consent to their euthanasia are concerned, I prefer to leave that issue to the ethicists.

(2nd Year Biology Student, David Jelescu)

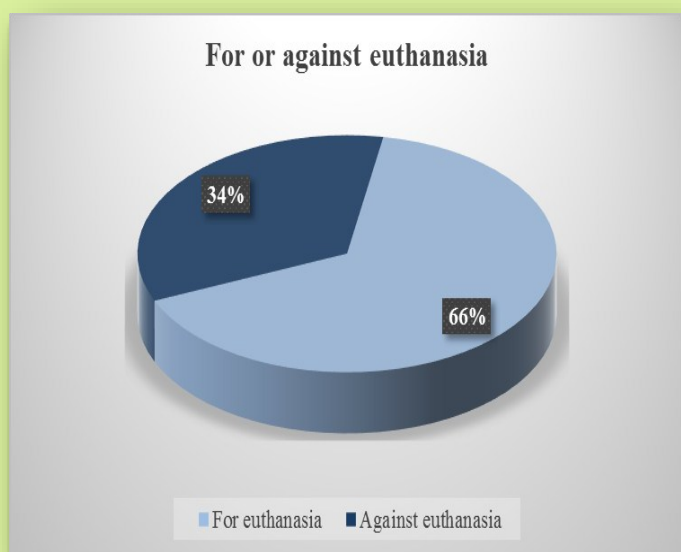
Every human being has the right to decide what happens to their life, especially if they suffer from a severe illness and they feel helpless. Someone's wish to be euthanized clearly expresses that neither do they want to be a burden for their acquaintances, nor live in a vegetative state.

(4th Year Industrial Biotechnologies Student, Antonia-Maria Mărgineanu)

I believe that this right, following an informed decision, can be given to any person faced with a medical issue with a profoundly unfavourable prognosis. In the absence of this right, many people in despair chose to end their own lives, usually with traumatic consequences for their close ones.

(2nd Year Biochemistry Student, Harald Bârzan)

I am pro euthanasia if the patient agrees to it, and if the patient is unconscious and the doctors believe there is not even a 0.5% chance of improvement, euthanasia should also be considered,



with the family's consent, of course. People shouldn't be left to suffer when it's clear that the grim reaper is breathing down their necks.

(2nd Year Biology Student, Giulia-Diana Alexandru)

I am pro euthanasia if the person in question wants it (that is if they are conscious or have been previously questioned) or if the relatives of the patient, after having consulted with the doctors, believe that the person is below the threshold of survival and their improvement is impossible.

(2nd Year Biochemistry Student, Sonia Ingrid Medrea)

I am pro euthanasia as long as it is someone's own decision, with low chances of survival, and not the decision of others. For better understanding I recommend the film *Mar Adentro* (The Sea Inside). The film is based on the life of Ramón Sampedro, a Spanish ship mechanic, who fought 28 years for the right to euthanasia.

(2nd Year Biochemistry Student, Andreea Vele)

I am pro euthanasia because I imagine that a life led in physical and psychological pain, or one led simply with the help of medical equipment, without a functioning brain, is not a life in itself. Of course, I strictly refer to those extreme cases in which nothing can be done to relieve the pain. Thus, I consider this option a very difficult choice to make, but one that strictly follows the relief of a life that can no longer offer anything but suffering, both to the person in question and their relatives. As I have previously mentioned, it is a choice, so I do not believe that people who make it should be condemned.

(1st Year Biochemistry Student, Emanuel Antoniu Pop)

3.Opinions of students who are against euthanasia.

Human euthanasia should be an easily practiced medical procedure, in the belief that this way we can end someone's suffering. Alongside abortion, human euthanasia is murder, in my opinion, and I don't believe we should have this kind of right on people.

(2nd Year Biochemistry Student, Antonela Diniş)

A person that resorts to this method is desperate and in need of help. I don't think that the solution to the problems the person faces is death.

(2nd Year Biology Student, Maricel Bocăneală)

Even though I am against euthanasia, I think some people have the right to choose this option, if they suffer from a painful and incurable illness.

(2nd Year Biochemistry Student, Rareş Cănilă)

Because every human deserves to live.

(2nd Year Biochemistry Student, Bogdan Damaschin, Alexandru Ioan Cuza University, Iaşi)

4.Do you consider euthanasia to be a good deed or murder?

It cannot be a good deed from any standpoint. For example, an individual suffering from terminal cancer is being applied euthanasia to end his suffering. How do I know for sure that this individual does not want to hardly carry his last moments in which he can enjoy sunlight or the singing of the birds? I cannot see it as a good deed but much rather murder.

(2nd Year Biochemistry Student, Antonela Diniş)

It is a good deed for those who suffer from an incurable and painless illness and murder for those sentenced to death (I believe that a life sentence and isolation is a fairer punishment for any individual who committed a severe felony, euthanizing him being luxury.)

(2nd Year Biochemistry Student, Rareş Cănilă)

I consider euthanasia to be a good deed for those with no chance of recovery and murder in the case of those who could still survive.

(2nd Year Biology Student, Giulia-Diana Alexandru)

Both, depending on the case. If the patient wants it - a good deed. If he is obligated and does not want to - murder!

(2nd Year Biochemistry Student, Andreea Vele)

A good deed, as long as it happens with the consent of the person subjected to it.

(2nd Year Biochemistry Student, Cristian Moldovan)

As it follows the relief of a burden too heavy for someone, I believe it is a good deed.

(1st Year Biochemistry Student, Emanuel Antoniu Pop)

5.How would you regard the medical staff that performed the euthanasia?

I would consider that medic a professional who is doing their duty, but who also has the cold blood and necessary strength of mind, because not everyone can end a person's life.

(4th Year Industrial Biotechnologies

Student, Antonia-Maria Mărgineanu)

They are people who have completed college and some years of residency and have experience in anesthesiology and toxicology.

(2nd Year Biochemistry Student, Harald Bârzan)

They do their duty if they act with the consent of the person in question or their family. I do not think that would violate the oath because euthanasia should be done by a specialist.

(2nd Year Biology Student, Şamşodan Liana)

I view them as normal people, without prejudice.

(1st Year Biochemistry Student, Vlad Vancea)

Like a normal person. They do only what they are told. It's part of the job, like doctors who make abortions.

(2nd Year Biochemistry Student, Andreea Vele)

I regard them as any other normal medical personnel.

(2nd Year Biochemistry Student, Picoş Răzvan)

I view them with indifference. But I am curious how they would view themselves when they put their head on the pillow at night, knowing that on that day they took someone's life without an extremely well-founded reason, and under the pretext of ending suffering.

(2nd Year Biochemistry Student, Antonela Diniş)

6. Do you think euthanasia should be legislated in Romania?

No. It should not be enacted because it would raise serious problems. Once euthanasia will be enacted, it will be uncontrollable. Although at first it was destined for ending the suffering of some patients, showing 'mercy' and 'compassion' to their pain, euthanasia would soon be widely practiced among patients with disabilities, the elderly or infirm children. On the other hand, the legalization of euthanasia would put immense pressure on the sick and on those who, because of old age or infirmity, would become a burden to their family or to society. So they are morally forced to accept this act. A report shows that although the purpose of euthanasia is to provide a patient with an "easy death", complications may occur and instead of patients dying quickly, some of them took days to die! In any case, examples and arguments can continue.

(1st Year Biochemistry Student, Florian Raula)

Yes, I think it should be enacted, although the Romanian people's mentality is still not open to it.

(1st Year Biochemistry Student, Emanuel Antoniu Pop)

No. It would be complete chaos. The reasons why I agree with euthanasia would be violated. Our country is not ready.

(2nd Year Biology Student, Șamșodan Liana)

Yes. I see that more people are choosing to take their lives in all sorts of ways, more or less human, and it is for their own good, and for their relatives', that the state should intervene and create a more humane alternative to end their suffering.

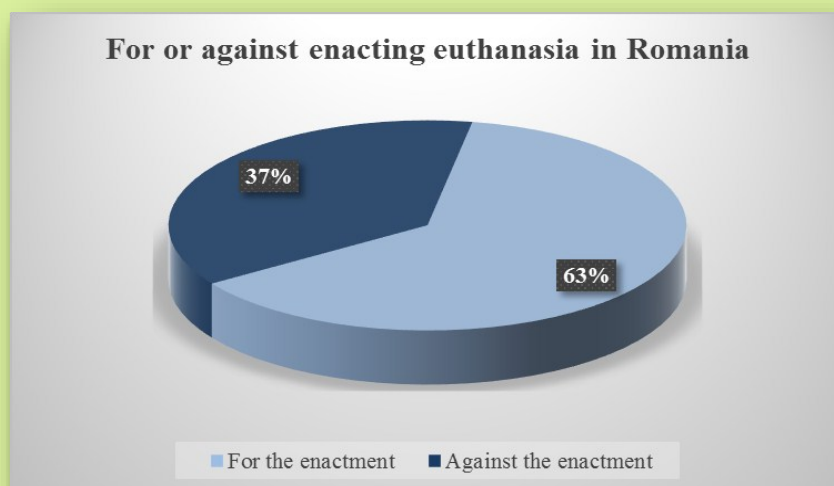
(2nd Year Biochemistry Student, Harald Barzan)

It should not be legislated. I do not consider this to be a technique that a civilised country would utilise.

(2nd Year Biology Student, Maricel Bocăneala)

Yes. I think that people should have the right to choose. Of course, I see this choice as a conclusion arrived at after being counseled by a psychologist, something you can not decide alone overnight.

(1st Year Biology Student, Mihăese Georgiana)



Interview

Lecturer Dr. Florin Crișan

*1st and 4th Years Industrial Biotechnology Students,
Rusu Dragoș Raul and Antonia-Maria Mărgineanu,
Faculty of Biology and Geology, Babeș-Bolyai University, Cluj-Napoca*

1.What did college life mean to you? During your time as a student, was there someone who guided your steps to what you have become?

Those were the most beautiful years, with long –lasting friendships and with the biggest hopes. My father was the one who opened my eyes, which led me to what I am today.

2.Can you tell us about your journey till today? What made you become a professor?

I started as a teacher in middle school in the countryside, then I continued teaching at a high-school in Cluj-Napoca, and after that I took on my career in the University: lab preparator, university assistant, lecturer. I believe that this is what I am best at, and I hope that the generations of students with whom I worked with in the last 25 years feel the same way.

3.You are a highly-valued professor by your students. What is your secret for this and how do you define your way of teaching?

Honestly, I think that in order to succeed in a certain field you must have a calling for it, how it is used to be said in the countryside. And I strongly believe that the students are those for whom I am obliged to share my knowledge with and they always give me from their vitality... which comes from their eternal youth, because students will always be young, beautiful, care-less and, because of that, merciless. I don't think there is a secret, I just don't see what I do like a job, more like a daily delight. I try to realize a communication based primary on respect, and the mutual need to make a good thing and feel good together with my social partners. A brilliant teacher of mine from college told us once: "the course can be as bad as a rape or, on the contrary, as enjoyable as a moment of love". I always wanted my students to be present at courses because they enjoyed them, and not out of fear of absences.

4.Do you have any expectations from your students? What kind of changes do you consider necessary in pre-university education so the high-school graduate would become the ideal student?

I wish that my students, after some years when we will meet again, would look straight at me, smiling and greeting me from the bottom of their hearts, not avoiding my glance. Changes in pre-university education... Well, first of all, the best students who also have a solid motivation and finances should go there. Also, the syllabus must be adapted after the possibilities and the necessities of the children. It must be different from what it is today, a display of knowledge by those who discharge it. We need a healthy and educated nation, exactly what politicians ignore today.

5. Most of the students will agree that the practical work in the Danube Delta is one of the most expected events of the university year. How much does this matter for a future specialist and why would you encourage others to take part in it?

I think that it is the place where you verify the efficiency of the courses and the labs. There, in the field. This practical work is essential, and the Danube Delta is our national treasure, which we must know and cherish. Moreover, it is the best way to recover after a difficult exam session in the company of colleagues and, why not, of the “most precious” professor (friends know why).

6. Why did you choose lichens as your research subject?

When Adam was still in Paradise, the good Lord made him acquaintance with Eve and told him: “Adam, she is Eve, now you can choose your future wife...” It is a choice for which I am partially responsible. They chose me.

7. Does the current state of scientific research in Romania disappoint you? Is “publish or die” a truism? Do scientific publications represent the calling card of a researcher?

Who is satisfied with it? What I do not consider fair-play is that researchers, for whom I have all consideration and respect, are in the same pot with teachers, all being measured, just like in the bed of Procrustes, with the same measure. This is what they do all day, only research. This is their job. We, principally, must teach. For all of us, one day has 24 hours. Of course, the scientific publications are the calling card of a researcher and it is normal. As long as in our acknowledgement as teachers our teaching activity is not appreciated at all -look up research management and promoting conditions- nobody stimulates us to be better teachers. It is the contrary. And then who would teach the students?



REFORESTATION

-The optimal solution for maintaining the ecological equilibrium-

*1st Year Biology Student, Robert Manciu
Faculty of Biology and Geology,
Babeş-Bolyai University, Cluj-Napoca*

Reforestation involves regeneration of forest areas that have been damaged or destroyed in advance. Sometimes forests are able to regenerate naturally if enough trees are left nearby or if seeds are dispersed in the deforested areas by animals or wind. However, in the case of forest areas that have been severely damaged, a natural regeneration is improbable, requiring manual replanting of some native species of trees.

Reforestation is needed because, every day, huge forest areas are damaged or destroyed on Earth. Some assessments suggest that an area of forest equivalent to 36 football fields is lost every minute. This deforestation is caused by many factors such as fires, deforestation of land for agricultural development and human habitat, forestry, mining and climate change.

Forests are of primary importance for many reasons, and deforestation is a serious problem that affects us all. Forests represent both the shelter of many species of animals and plants and the supplier of livelihood for most people in the world and also a source of paper, wood, food and countless products used

in medicine, cosmetics and other fields. Forests are vital for the health of our planet, maintaining the water cycle, preventing soil erosion, absorbing and also storing enormous amounts of carbon dioxide that contributes to climate change mitigation. Trees use the carbon dioxide we exhale and give us the indispensable oxygen for our respiration in the process. If the number of trees will decrease, carbon dioxide levels in the atmosphere will rise. In this case, the planet's average temperature will increase, leading to disastrous climate effects, including rising sea levels and drought in some areas. Everyone has duties when it comes to the environment.

There is no substitute for reforestation and a more effective method for restoring the balance in nature than by planting trees and, thus, increasing the forested area hasn't been determined. Many people believe that by planting a sapling to replace every tree cut will make the proper regeneration of forests possible. In reality, the forest regenerates naturally. After logging, scions will grow rapidly because they have direct exposure to sunlight and more space. However, nature is





sometimes offered a helping hand by reforestation. This human intervention accelerates the ecological cycle and is a necessity when natural regeneration is insufficient, or if a too lengthy development of species at the end of disturbances, such as fires, diseases, damage done by insects or forestry. The trees from which seeds for reforestation actions are collected do not have parasites, having optimal physical characteristics.

With the coming of spring and the opening of Cluj-Napoca's green volunteering season,

members of the Students for Nature Organization contributed enthusiastically to the revival of nature in an action organised by CERT Transylvania. The event represented the third edition of spring afforestation from the "CERT for the environment" program and it took place on March 28, 2015 in Hoia-Baciu forest, with the aim of planting ten thousand saplings over an area of two hectares.



http://awsassets.panda.org/img/c_c_wwf_canon_michel_gunther_1_366947.jpg

TRANSGENIC ORGANISMS

- Overview and current discussions -

*1st Year Industrial Biotechnologies Student, Rusu Dragoş Raul
Faculty of Biology and Geology,
Babeş-Bolyai University, Cluj-Napoca*

With the transition from the hunter-gatherer stage to the sedentary, proto-agriculture stage, the human species began exploiting nature, taming animals and growing wild plants. This trend of prehistoric human communities to abandon their nomadic lifestyle for a non-migratory one is an important milestone in the history of mankind, with major implications for human behaviour and the global ecology. From the moment when prehistoric people began to interbreed domesticated animals or cultivated plants, a process that paved the way to genetic transformation was initiated.

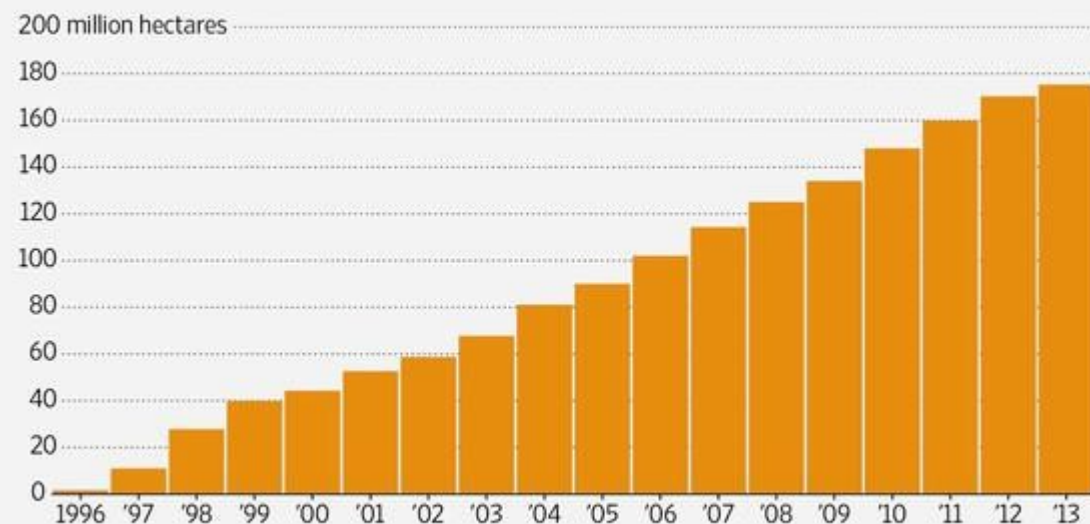
Genetic modification, or manipulation, is defined as the process by which particular genes of interest (for example genes that code for resistance to stress factors) are isolated from the genome of an organism

and ligated to the DNA of another organism, in order to obtain a new sequence of DNA which contains the desired genes. By means of recombinant DNA technology, developed in the late 70's, gene transfer can be performed not only within the same species, but also from one species to another. The main advantage lies in the fact that the emergence of the desired traits is faster, thus being more efficient than conventional hybridisation. Genetically modified organisms, also called transgenic organisms, have a wide applicability in various fields, from the food industry to pharmaceuticals, but their use is not met without critique, and the opponents of genetic engineering warn those who practice it about possible risks, as well as the ethical or moral aspects involved.

In the 21st century, mankind is still

Growing GMOs

Gentically modified crops have grown steadily, on average 10 million hectares a year.



Source: International Service for the Acquisition of Agri-biotech Applications
Rani Molla/The Wall Street Journal



confronted with widespread poverty and hunger, especially in developing countries. Malnutrition is one of the main causes of infant mortality in developing countries, however, transgenic organisms have been used successfully to combat this problem. The variety of genetically modified rice (*Oryza sativa*) named Golden Rice fits this category. By creating this genotype scientists wanted to obtain more nutritionally valuable plants, in this case aiming at the synthesis of β -carotene, a precursor of vitamin A. The plant material is intended to be provided to subsistence farms (mainly in India) where vitamin A deficiency leads to the death of many children under the age of five, or causes blindness.

On a different note, the practical potential of genetic modification is recording high applicability in the case of expanding agricultural areas localised in places with strong abiotic stress factors. A good example would be fish farms in northern Canada or Western Europe, where the introduction of transgenic fish resistant to low temperatures would positively affect production and therefore the profit.

The pharmaceutical industry has succeeded in obtaining recombinant medicines, monoclonal antibodies and vaccines. The vaccine for hepatitis B can be synthesised by a transgenic species of yeast. The risks that can be felt by human health or the environment are the main subject on which these controversies concerning genetically modified organisms rose. Some scientists warn of environmental instability caused by the uncontrolled spread of GMO's in the wild, or potential problems

that may arise from the consumption of products derived from these organisms. However, biotechnology companies assure the public that they take these aspects into consideration, the products being subject to rigorous testing before marketing. The very act of genetically modifying an organism has sparked controversy among ethicists, who contest this process with ethical, moral and even religious reasons. Economically, the question of a possible monopoly that may arise after the enactment of transgenic products in several countries around the world is debated. Due to the high costs associated with genetically modifying organisms, economists believe that the emergence of local companies in the field would be suppressed by multinational ones.

Currently, researchers continue to develop this technology and even encourage its spread in order for the potential that it represents to be exploited. Although countries like Brazil, Argentina and USA produce GMO's, and companies like Monsanto prosper, Europe maintains the pressure on this practice and insists on the undertaking of more elaborate tests.

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CANCER PHYTOTHERAPY

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Natural medicine is used from ancient times and remains until today one of the most important branches of medicine, but also an alternative for those who avoid the pharmaceutical industry and avoid using drugs created synthetically. Plants can have a beneficial-curative effect on human health and it's a proven scientific fact that they may help relieve or even cure some diseases. Perhaps for this reason scientists pay more attention to them and try to extract active substances (alkaloids, glycosides, flavonoids) from them and to prepare natural medicines for diseases that can be cured or ameliorated in other ways. One of the diseases against which plants can fight is cancer.

Cancer is caused by a rapid and chaotic increase in the number of cells in an organism, this leads to the formation of a tumour in a specific area of the body or in an organ, which is considered to be the main tumour. These cells multiply anarchically and invade other tissues or neighbouring/distant organs, thereby forming metastases. Cancer is the result of a gene mutation occurred during cell division. With all the knowledge in medicine, chemotherapy or surgery, in most cases it cannot be stopped and leads to death.

Cancer mortality has reached alarming levels, and the number of victims of various types of cancer increase annually in a worrying pace. Also, the usual methods of treatment don't have the desired results and people are submitted to months of pain and unpleasant conditions. In such a time, specialists turn their thoughts to other living organisms to find help and hope to improve the living conditions of the sick, prevent or even treat relentless diseases.

An example would be the root of dandelion (*Taraxacum officinalis*) which is known

from ancient times as a common "weed" and is used, for example, as a diuretic and for treating indigestion.

Studies have shown that extracts of dandelion roots have great potential in the case of melanomas, because they contain terpenes and steroids, which lead to cancer cell apoptosis due to the high degree of toxicity. This may be associated with a "suicide" of these cells, without affecting non-cancer cells. More specifically the truthful chemopreventive component is taraxsterol, but biochemical investigations are not adequate enough to determine their exact mode of operation.

Taraxacum sp.



http://cf.itkcdn.net/herbs/images/std/118616-312x385-Whole_Dandelion.jpg

However, it was noted that the main action occurs in the mitochondria of cancer cells, where the taraxsterol generates reactive oxygen species (ROS). ROS reshapes the structure of mitochondria by generating abnormal respiratory chain complexes. However, these ROS befriend positive feedback for the formation of a large number of radical species that increase the risk of cancer. This process occurs only when there is too much production of ROS, otherwise they are useful in mitochondrial processes. ROS is produced naturally in the human body and they may have both beneficial role when kept between parameters of certain standards, but also serves a toxic, harmful role, when these parameters are exceeded, triggering the emergence of various diseases, even some forms of cancer.

Another important medicinal plant, mainly due to its antioxidant properties, is *Camellia sinensis*, a Chinese herb used worldwide for body detoxification, losing



weight or as a substitute for coffee. This plant is used for the production of several types of tea: green, black and white. For this purpose, the drying technique which is used is of great importance. The demand for all three types of tea has increased, but the first position is taken by green tea, being consumed in the greatest amount. Studies show more and more uses, including the ability to treat cancer. The watery extract of green tea inhibit the proliferation of breast carcinoma cells by stimulating expression and activating the enzymes that induce apoptosis. At the same time, it inhibits cancer cell migration to other areas of the body and thus reduces the risk of metastasis in lung and liver cancer, and also reducing the volume of existing tumours, facts noticed in studies done on laboratory mice. In conclusion, the watery extract of *Camellia sinensis*, has great anti-cancer and anti-metastatic potential.

White tea, produced without fermentation, is consumed for its antioxidants, vitamins, minerals, essential oils, flavonoids and other polyphenols contained that have antioxidant, antiviral, antifungal, antibacterial and, last but not least, anti-cancer role. The mechanisms which suggest the importance for health are due to enzymes that remove reactive oxygen and which are involved in cell signaling and play part in detoxification or in setting up checkpoints in the cell cycle. Caspases, cysteine proteases that trigger cell apoptosis are contained in extracts of white tea and so determine the programmed death of cancer cells in the first 24-48 hours after their administration, without affecting healthy cells. Cytotoxic and antiproliferative effects

of the extracts of *Camellia sinensis* consist in the activation of caspases 8 and 9, inducing apoptosis on a mitochondrial pathway. Therefore, this study demonstrates the anticancer, DNA protection and antioxidant effects of white tea extracts, thus inhibiting the proliferation of colon cancer and determining the apoptosis of cancer cells without being toxic for normal fibroblasts, as a potential chemotherapeutic agent.

Black tea is made by fermenting the leaves of *Camellia sinensis*. It is known to prevent heart attack, atherosclerosis, Parkinson's disease and to reduce the risk of breast, ovarian and colon cancer. Black tea contains polyphenols, powerful antioxidants that reduce the amount of reactive metals from the body and are afterwards able to catalyze the formation of reactive hydroxyl radicals. The most important aspect is the black tea extract dose administered,



because it was observed that a single dose has no effect, while a larger number of doses can lead to cancer cell apoptosis. The study demonstrates that black tea may play a role in preventing cancer, but this requires a continued administration of the optimal dose. Current studies on black tea extracts confirmed the anti-proliferative capacities and its genotoxic properties in the colon and breast cancer.

Due attention should be paid not only to angiosperms, but also to gymnosperms considering also *Cephalotaxus sp.* *Cephalotaxus harringtonia* contains homoharringtonin, an alkaloid approved by the USFDA (United States Food and Drug Administration) as a treatment for myeloid leukemia. Thus, it came to studies that investigate anti-cancer potential of other *Cephalotaxus* species. For example,



Cephalotaxus griffithii contains such compounds, but the effects of the anti-proliferative alkaloids differ depending on cell type and dosage. In other words, the compounds react specifically to various forms of cancer. In general, their action is manifested by blocking the cell cycle and the beginning of the apoptotic process of cancer cells, but also by the stagnation of cells with damaged DNA in the G2 phase of the cell cycle, allowing its recovery by using p53 protein. Yet again, the roles of caspase-9, which triggers the mitochondrial pathway,

and caspase-8 which triggers cell death are highlighted. The disadvantage is the existence of telomerase which inhibits cell apoptosis and increases the resistance of cancer cells to anti-cancer drugs. In conclusion, the extract of *Cephalotaxus griffithii* has anti-proliferative and apoptotic effects, but can also increase resistance to drugs and it is considered one of the most powerful anti-cancer drugs.

A plant genus discussed over time, from whose species biologically active components are extracted, is *Phyllanthus*. Recently, scientists have turned their attention to the *Phyllanthus engleri* species that grows in Zimbabwe, Tanzania, and whose bark and root are known to host toxic substances. Latest studies have explained how researchers have isolated from the bark of *P. engleri* two sesquiterpene guanines, englerins A and B, capable of inhibiting the proliferation of kidney cancer. In contrast to other treatments for kidney cancer, the active compounds of this species are specific and potent to disable the cancer cells. The process is realised through the activation of protein TRPC4 and TRPC5, renal cell cancer killer and are of no negative impact over the healthy ones. Positive and promising results have made this project to gain approval and to be funded by the National Cancer Institute considering the fact that a potential drug wants to be obtained.

Therefore, studies in recent years show more and more importance of plants in treating illnesses and plant extracts shock with anti-cancer properties, which stops the proliferation of cancer cells or cause their apoptosis, leaving healthy cells intact and thereby helping to improve people's quality of life. Hence, these extracts can be considered an alternative method for treating cancer and deserve attention from researchers, since the plants never stop surprising us through their properties, and so it is demonstrated once again that the relationship between man and plant is crucial.

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Secretory structures of latex and the importance of latex for plants and humans

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Vascular plants are characterized by the presence of two tubular anatomical universal systems:

- The Xylem is the prominent system that participates in the transport of water and mineral salts taken from the ground and led to the organs and to the photosynthetic structures.
- The Phloem is visible to a limited extent and it leads photosynthesis products in all the parts of the plants, for feeding the cells, but also in storage organs and structures.

A consequence of the evolution and specialization of plant cells is the existence of two more tubular systems, not as common as those mentioned above, but complex anatomically and physiologically. They are widespread among species from the Plantae kingdom, and have a significant importance.

The tubular components are specialized in secretion, storage and/or physical release of secondary metabolites, being represented by secretory and latex channels. Laticiferous tissues are structures composed of secretory cells that are designed to store their own product – latex forming a prosenchymal network. Originally, the term "latex" (lat. *Latex* = fluid) was associated with any substance secreted in the plant. Then, it defined a complex colloidal mixture consisting of polymer microparticles dispersed in a watery medium.

From a structural viewpoint, there are

two types of laticifers: articulated or inarticulated. Inarticulate latex structures are unicellular, plurinucleate, branched or not. Their development is achieved through high growth, reaching even tens of centimeters long. Both during embryonic development and during growth, in cariokinesis, inarticulated laticifers increase and branch or not, creating a system which will expand the whole plant. Some hypotheses state that this growth process would take place on schizogenic path, so that the cell, initially small, grows and expands in the existing intercellular space, followed by an increase in development by amplifying its turgor, similar hypothesis with the one that states that the processes of defence and response in case of injury would be triggered also by a schizogenic path (Pickard, W. F., 2008).

This type of laticifer can be regularly encountered in the Asclepiadoideae subfamily and Euphorbiaceae family. On the other hand, articulated laticifers differ from the inarticulated ones by their formation process and by being composed of several uninucleate cells.

The formation process begins in the embryo, from a group of cells arranged in series, situated in the apical root and caulinar meristems. These cells grow and the cell walls between them are dissolved, thus forming tubular vessels called latex vessels which, in turn, extend throughout the plant, can be anastomosed with each other, or not.

This type of laticifer is common in species from Papaveraceae families and species from Euphorbiaceae family rubber trees. Also, it can be found in Moraceae family (Panama rubber tree - *Castilla elastica*) and Asteraceae family (*Taraxacum sp.*). In general, both types of laticifers are located in mature plants, in all organs: root, stem, leaves and even fruits, a particular location is the cortical tissue.



On the other hand, in the physiology of laticifers, it should be noted that the mode of action is based on the continuous turgidity state of the cell. Thus, if an organ of the plant and, consequently, the cells that form it, suffer a mechanical lesion (rupture), the latex, due to the increased pressure in the central vacuole is stored, "break out" of the lysed cell, covering the whole space created after injury.

In most cases, the latex is a white substance; it can sometimes be yellow, orange or red in colour. It has a rich chemical composition, containing alkaloids, tannin, gums, resins, proteins and carbohydrates, with the role of protecting against attack from predators, bacteria, and it coagulates in the presence air. In literature there are publications based on research which state that latex has a concentration of 500-1000 protection substances higher than any other plant tissue, and in some cases it is even toxic for the plant. A series of experiments demonstrated that pests such as snails, caterpillars and various insects consume the plant parts which do not have laticiferous channels, the latex being harmful for some of them.

From a molecular and cellular point of view, following studies that prove the absence of chloroplasts in mature laticifers (Sacchetti et al., 1999) and the beliefs that there are no functional plasmodesmata with neighbouring cells, it can be said that the cells get their energetic substrate apoplastically, which leaves electrogenic "footprints" of an active membranous transport on the electrophysiological behaviour of the cell. Thus, the loading of nutrients in laticifers is made simplistically, between the phloem and the existing parenchyma, from the phloem to the secretory cells. Hence, the actual charging will take place apoplastically in laticifers through a membrane transport protein, of simport type H⁺ with a monosaccharide (Bout et al., 1999). Then, the received nutrients will be used both for the energy substrate and as a precursor in the synthesis of latex. The proof is the existence of a well developed tubular smooth endoplasmic reticulum, of a Golgi apparatus with numerous dictiosomes and the large number of leucoplasts, in the secretory cells.

Laticifers are widespread in the Plantae kingdom. They are present in more than 40 families, both monocotyledonous and dicotyledonous, as well as ferns and some gymnosperms. It is important to note that these structures are not characteristic to the Plantae kingdom and can be found in species from the Fungus kingdom (eg. Peppery Milkcap mushroom - *Lactarius piperatus*).

The latex is particularly important for humans, among its basic uses such as natural rubber production and opiate drugs. The most sought after latex product is the natural rubber, which has a wide range of applications, and various derivatives which are used in the manufacture of surgical





gloves, catheters, balloons or mattresses. The main species from which most latex is harvested from for this purpose is the rubber tree (*Hevea brasiliensis*).

Of great importance for man is also the latex from opium poppy (*Papaver somniferum*) used in obtaining powerful painkillers and sedatives such as codeine and morphine. Other applications are the production of chewing gum from the latex of the plant *Dyera costulata*, or various forms of adhesives and paints, which is based on the property of the latex to coagulate in the presence of air after water evaporation.

Latex secreting structures are the result of long evolutionary processes of specialization and adaptation to the environment and their presence confirms a fact already known, that plants are complex, highly specialised and crucial organisms for the human species.

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The Concept of Biological Evolution

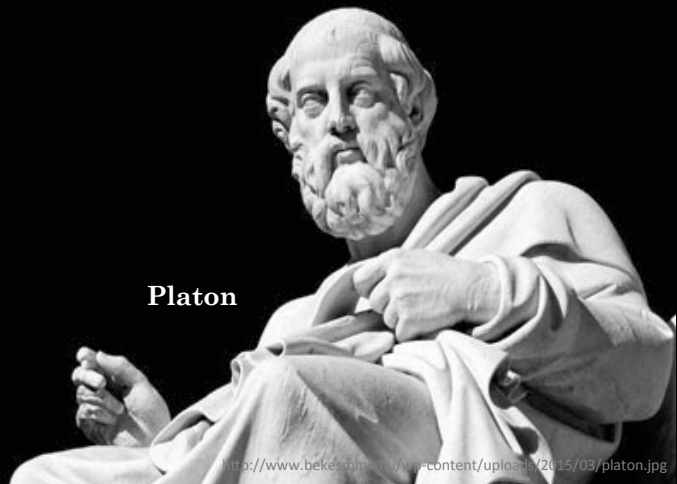
- A Short History -

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Ernst Mayr named Plato "the great anti-hero of evolution," because of his enunciation of the Theory of Forms. According to this theory, behind every object or phenomenon lies an idea, an ideal form which determines the real form of the existing object. These "forms" or, as Plato described them, archetypes dwell in a world of ideas, which, although immaterial, is more real than the material world in which the archetypes manifest themselves. In Plato's conception, species, like any other type of object, are direct manifestations of the archetypes from the world of ideas, therefore lacking the ability to change, to modify their form.

Plato's ideas concerning the forms of objects were forwarded to his disciple Aristotle and to the Stoic school of philosophy. These ideas have endured, through Aristotle's influence, throughout the Medieval period, having been integrated into the Christian vision of the world. Despite this, philosophers before Plato, as well as those after him, have had ideas regarding the potential of change for species.

Aristotle could be considered, without exaggerating, the father of biology. In his works, he describes different species of animals, he meditates on the existence of a "soul", describes some anatomical structures and classifies species of animals in accordance with a natural scale, in inferior and superior organisms. Animals are classified in connection with this natural scale, being ranked depending on their structural and functional complexities. Their positions on the scale are fixed, the species, in Aristotelian conception, being unable to evolve.



Platon

The Christian theologian Augustine of Hippo (354-430) rejected an *ad litteram* interpretation of the Genesis, suggesting that some species could have appeared by the "decomposition" of others, over a long period of time.

With the fall of The Roman Empire, these ideas about the evolution of species have been forgotten in Europe, but were taken up by Islamic philosophers, who continued to develop them. They passed on ideas about the evolution of animals from lesser to more complex forms, and even ideas concerning the evolution of life from nonlife.

The complete escape of science from the influence of Christian theology happened in the 17th century, through René Descartes' (1596-1650) mechanical philosophy. This philosophy is based on the idea that the universe is similar to a machine which functions due to a precise mechanism, the idea of a divine influence no longer being needed. Further mechanistic theories were formulated, according to which life, the Earth and even the Universe have entered existence on their own, without the exertion of divine influence.

In the second half of the 18th century, Carl Linné lays the foundation of modern taxonomy, introducing the binomial nomenclature system. Despite this, Linné was an adept of fixism, rejecting any kind of evolutionary theory.

At the end of the 18th century, the great naturalist Georges-Louis Leclerc, Comte de Buffon spoke about species as a variety subject to change, under the influence of environmental factors. He believed that all species evolved from a number of original species, being a supporter of the theory of spontaneous generation, according to which organisms appeared spontaneously and by themselves. In addition, Buffon, in his body of work, theorises a mechanistic origin of planet Earth and dismissed any kind of supernatural influence regarding its beginnings.

Naturalist Erasmus Darwin, the grandfather of Charles Darwin, believed that all current organisms come from simple ones that lived in mud. In his diary, Darwin stated that although in his youth he came into contact with his grandfather's ideas, they did not greatly influence him.

The Darwinian concept of evolution was possible largely due to progress in geology and paleontology. In 1788, James Hutton, the father of modern geology, proposed the uniformitarian concept, according to which Earth's crust reached its current form following the action of forces and processes (erosion and sedimentation) which have always acted on the crust and, over a large period of time, it gave the crust its current form. This view was opposed to the catastrophist conception, which assumed that Earth's surface was shaped by sudden and brief violent events, so-called "disasters". Hutton believed that by understanding the processes occurring on Earth, such as erosion and sedimentation, the age of the planet could be estimated. Hutton's ideas were later developed by geologist and botanist Charles Lyell in his work "The Principles of Geology" (1830), ideas that had a strong impact on Darwin.

Towards the end of the 18th century, English geologist William Smith began studying the arrangement of rock layers, thereby laying the foundation of stratigraphy. Smith has developed a method for identifying these rock layers based on fossils found in them. Smith has developed a method for identifying these rock layers based on fossils found in them.

Naturalist Georges Cuvier founded paleontology and comparative anatomy by comparing the fossils to current organisms. He expanded Linné's anatomy by grouping classes in phyla, and by inserting both living and fossil species in his taxonomy. Also, Cuvier was one of the main supporters of the catastrophist conception and the one to confirm the veracity of extinctions. Today, it is known that Earth's geology was created by both lengthy processes and sudden, short-lived catastrophic events.

Comparative anatomy was also an area which has brought strong evidence for evolution of species by natural selection. The great anatomist Richard Owens was an important collaborator of Darwin, despite the conflict that took place between the two as a result of the former's creationist concepts.

In 1809, naturalist Jean-Baptiste Lamarck proposed the Theory of Transformism. According to this theory, species evolve due to internal forces that determine their evolution towards more complex forms in terms of structure. As stated by Lamarck, the efforts of individuals can lead to their acquisition of new traits, which will subsequently be transmitted to the progeny (mechanism known as the transmission of acquired traits). Thus, at the base of evolution lie the species efforts to adapt to new environmental conditions. Also, according to

Lamarck, not all existing species have a common ancestor, but some occurred spontaneously.

In 1859, Charles Darwin published “On the Origin of Species,” the piece of work that laid the foundation of modern Evolutionary Theory. Its core concept is natural selection, by which organisms are in constant competition with one another and only the fittest survive and pass on their characters. In order to explain heredity, Darwin introduced the theory of pangenesis, which states that during reproduction small particles, called gemmules, are formed in the organism’s cells and transmitted to its genital organs. Thus, during reproduction, information about the entire body can be transmitted to the offspring. Darwin tried to use this, as complementary to the theory of evolution by natural selection, to try and explain sexual reproduction, heredity and cell regeneration. This theory is rejected completely with the enunciation of the laws of heredity by Mendel.

Explorer and naturalist Alfred Russel Wallace had similar ideas about biological evolution. Wallace held an intense correspondence with Darwin on this issue and, apparently, gave up his ideas in favour of Darwin’s. These ideas helped Wallace initiate a new field of study: biogeography.

Also, with respect to Wallace, a particular discussion about the peacock’s tail between him and Darwin is well known. Wallace began to show some doubt about the primacy of natural selection, citing that the peacock, with its large and richly coloured tail, moves with greater difficulty and can easily be detected by predators. It took Darwin about ten years to solve this problem.

In 1871, Darwin published his answer to this problem in “The Descent of Man, and Sexual Selection”. The peacock’s tail, according to Darwin, is meant to show the male’s physical condition to females, prompting them to couple with only the fittest males. The richer and more colourful the male’s tail, the better he is adapted to the environment in which he lives. This selection of mating partners is called sexual selection, which allows only the fittest individuals to pass on their genes.

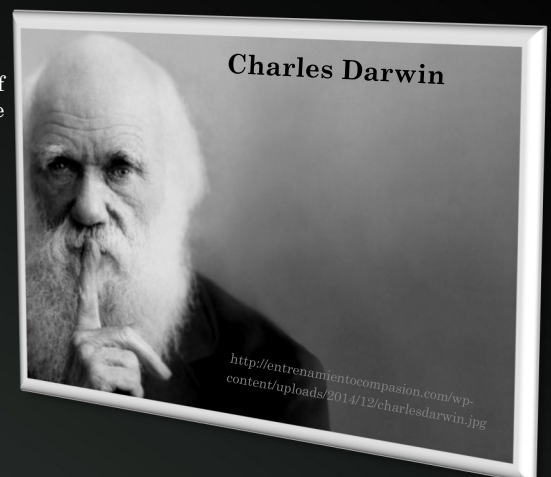
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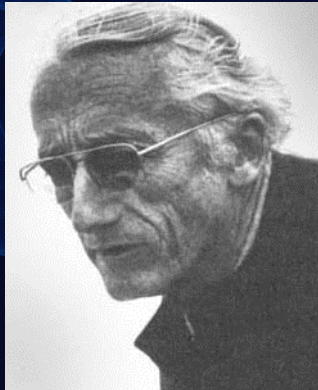
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JACQUES COUSTEAU

(1910-1997)

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"What is a scientist after all? It is a curious man looking through a keyhole, the keyhole of nature, trying to know what's going on." - **Jacques Cousteau**

Jacques Yves-Cousteau remains known worldwide as a French explorer who was distinguished in several areas: scientist, filmmaker, conservationist, photographer, author and researcher. A member of the French Academy, Cousteau pioneered the concept of marine conservation, and with Émile Gagnan, developed the Aqua-lung, the first effective underwater breathing equipment.

Jacques Yves-Cousteau was born on June 11th 1910, in Saint-André-de-Cubzac, Gironde, France. His higher education began in 1930 at the École Navale, where he graduated with the rank of artillery officer.

In Toulon, while serving on the vessel *Condorcet*, Cousteau conducted his first underwater experiments with the help of his friend Philippe Tailliez, who provided him

with a pair of rudimentary underwater goggles. Apart from his work as an officer, Cousteau served in the French Navy Intelligence Service and was sent on missions to China, Japan and The Soviet Union.

World War II marked a turning point in the evolution of diving. In 1940, after the establishment of the German zone of occu-

pation in France, Cousteau's family took refuge in Megève, where Jacques befriended Marcel Ichac. In 1943, the pair won an award from the Congress for Documentary Films for producing *Par dix-huit mètres de fond* ("18 Meters Deep"), the first French motion picture shot underwater, achieved in the previous year without the use of underwater breathing equipment.

Cousteau was not the inventor of the first underwater breathing system. In 1939 he used an underwater breathing system developed in 1926 by Commander Yves le Prieur. However, Cousteau was not happy with the time allowed by this system for underwater exploration. Thus, he added a regulator invented in 1942 by Émile Gagnan which extended the duration of underwater breathing. In 1943, Cousteau tried the Aqua-lung breathing system for the first time, a system which finally allowed for a longer underwater exploration.

In 1946, Cousteau and Philippe Tailliez introduced the film *Épaves* to Admiral Lemonnier, who offered them the responsibility of establishing the Groupement de Recherches Sous-marines (Underwater Research Group) of the French Navy.

In 1948, Cousteau started his first expedition in the Mediterranean Sea aboard the ship *Élie Monnier* with a crew that included Marcel Ichac. This team conducted an exploration of the Roman shipwreck Mahdia off the coast of Tunis. This was the first underwater archaeological operation using modern diving systems and paved the way for underwater archaeology. The expedition was captured on film and named *Carnet de plongée* by Cousteau and Ichac, being presented in 1951 at the Cannes Film Festival.

Cousteau's first adventures were narrated in his first book, *The Silent World: A Story of*

Undersea Discovery and Adventure, written in collaboration with Frédéric Dumas and published in 1953. An interesting aspect is Cousteau's decision to write the book in English, although he was French (Cousteau spent part of his childhood in the United States and spoke English fluently). The book has been translated into approximately 22 languages, has sold over five million copies and has formed the basis of the 1956 documentary film *The Silent World*, which won the Oscar for the Best Documentary Film. It also received the Palme D'or at the Cannes Film Festival, the first and only documentary to win this award until 2004.

In this book, Jacques Cousteau correctly foresaw the existence of the harbor porpoise's (*Phocoena phocoena*) echolocation abilities. He reported that his vessel, the *Élie Monnier*, was heading for the Strait of Gibraltar when it began to be pursued by a group of porpoises. Cousteau changed the ship's course by a few degrees from the optimal one through the center of the strait and porpoises followed him for a few minutes, then headed back toward center of the strait. It was obvious that they knew where the optimal course was, even if people did not know. Cousteau concluded that the cetaceans have an ability which works somewhat like a sonar, still a fairly new concept for submarines at that time.

In 1950, Cousteau rented the ship *Calypso* from Thomas Loel Guinness for the symbolic sum of one franc per year, re-equipped it as a mobile laboratory for field research and it was his main vessel for diving and filming until 1996.

He was elected director of the Oceanographic Museum of Monaco in 1957, a post he held until 1988. Two years later, in 1959, he was involved in the establishment of Confédération Mondiale des Activités Subaquatiques and served as president of this fed-

eration from 1959 to 1973. Also in 1959, with the help of Jean Mollard, he built SP-350 Denise, an experimental underwater vehicle capable of holding two people and to dive to a depth of 350 meters. This successful experiment was repeated in 1965 with two vehicles that dived to a depth of 500 meters.

In 1964, he made the documentary *World Without Sun (Le Monde sans soleil)*, his second film to win the Academy Award for Best Documentary.

After meeting with several US television stations in 1966, Cousteau founded the documentary series *The Undersea World of Jacques Cousteau*, a series which ran between 1966 and 1976 and was broadcasted in over 100 countries. A second series of documentaries, *The Cousteau Odyssey*, ran from 1977 to 1982, among other series. Unlike the first series, *The Cousteau Odyssey* did not focus on different species but emphasised his growing concern about environmental destruction. Overall, Cousteau left behind over 120 television documentaries and his programs have received more than 40 Emmy nominations, the most important awards given for television.

In 1973, enjoying his fame and the support of many people, Jacques founded the *Cousteau Society* in an attempt to draw attention to the degradation of ecosystems in the underwater world. The organization developed rapidly and has grown to 300,000 members worldwide.

Although many critics have questioned his scientific claims, Cousteau never considered himself an expert in any field. His films and books - including the *Undersea Discoveries* series in eight volumes and the encyclopedic series *Ocean World* in 21 volumes - have a

lyrical quality that presents his great love for nature. However, this optimism was often overshadowed by his environmental concerns. Cousteau often demonstrated, perhaps more than any of his contemporaries, the deteriorating quality of terrestrial and aquatic environments and how this destruction is irreversible. He continued to speak publicly about environmental issues until the end of his life. In 1992 he was invited to the United Nations' Conference on Environment and Development in Rio de Janeiro and remained a main consultant for the United Nations. In the last years of his life he planned the construction of the vessel *Calypso 2* in order to replace the original ship. This ship, worth 20 million dollars, was to be powered by solar energy and to include television studio equipment, a marine laboratory and facilities for satellite transmission. However, this plan was not brought to an end because Cousteau died on June 25, 1997 in Paris, France, at the age of 87.

Throughout his life, Jacques Cousteau has received numerous honours. In 1961 he was awarded the Gold Medal of the National Geographic Society by US President John F. Kennedy. In 1972 he was appointed Commander of the Legion of Honour; in 1985 he received the Grand Cross of the National Order of Merit and the same year he received the Presidential Medal of Freedom, the highest civilian honour in the United States, from President Ronald Reagan. In 1987, thanks to his work in television, Cousteau was included in the Television Hall of Fame in the United States. In 1988 he became a member of the French Academy. His hometown, Saint-André-de-Cubzac, paid tribute by dedicating him the "*rue du Commandant Cousteau*" (The Street of Commander Cousteau), a street that leads to his parental home, on which a commemorative plaque has been mounted.

Review

Cosmos: A Spacetime Odyssey

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“Cosmos: A Spacetime Odyssey” is a series of 13 documentary episodes filmed in 2014, hosted by the well-known astrophysicist Neil DeGrasse Tyson. This documentary is based on Carl Sagan’s book “Cosmos” and it is one of the boldest attempts of popularizing science in the last years. In this series, Neil DeGrasse Tyson invites us aboard the Imaginary Ship in order to start the journey in the wonderful Universe in which we live in. From dark matter to the evolution of life on Earth; from DNA to quantum physics, this journey is meant to bring curiosity in the eyes of an adult and fascination for science in those of a child.

Comparing to the original series realised by Carl Sagan in 1980 which ended up with the awareness and expected consequences of a nuclear war, “Cosmos: A Spacetime Odyssey” attracts attention on climate changes and it gives a wake-up call for future generations to make the change which will assure the future of mankind.

Beside the scientific data and theories, this documentary presents the biographies of some of the most remarkable scientists: Isaac Newton, Albert Einstein, Edmond Halley, Joseph von Fraunhofer, Galileo Galilei and more. The research processes which lead to remarkable discoveries, along with some persecutions that scientists had to deal with during different historical periods are also presented.

Regarding the technical aspect of the documentary, it is full of special effects and animations intended to make the scientific universe accessible to people regardless of age and scientific literacy. Therefore, there are all kinds of elements presented, from cell organelles to distant planets; the design and animation are good regarding scientific standards. But the beauty lies not only in its aesthetic nature, but also in the host’s rhetoric. Neil Tyson’s eloquent explanations and the exciting perspectives on the elements of nature, like the interior of a cell or a distant planet, and the very eloquent explanations of



Neil Tyson do not fail to enrich the knowledge of the audience on different subjects.

Of course, the series could not avoid being subjected to controversy, not only of scientific nature, like the origin of the universe, but also of cultural nature, regarding the history of science in western culture. The series was also criticised by creationists because in their opinion it promotes a blind belief in evolutionary theory. Even from the beginning of the series there were controversies regarding the first episode, where astronomer and monk Giordano Bruno's persecution by the Catholic Church was presented. It was affirmed that this scene was an unfair attack on the Catholic Church.

Regarding this documentary series, it does not focus only on knowledge but also on the acknowledgement of future researchers and scientists to always "question authority", as is used to be said in the series, to have the courage to demolish old scientific theories as long as they are no more available and if scientists have solid proof for doing it. Also, the curiosity and the courage to challenge the unknown determine us to make scientific progress.

In my opinion, one of the most remarkable pictures is the one of "The Cosmic Calendar", a metaphor used in the documentary to measure time in our Universe. For example, if we can shrink the whole life of the Universe in the twelve months of the year, all of human history would occupy the last seconds of the last day of December. Another scene was the one in which the interrelations of different species of animals and plants were presented

from a genetic point of view. Because of the fact that, more or less, we share the same sequences of genetic code with all living beings, it is reasonable to affirm that all living beings have a common ancestor, which, millions of years ago, managed to adapt to the environmental conditions. Consequently, life diversified, giving birth to the various organisms present in the history of Earth, including those which can

be seen today.

In conclusion, the documentary series "Cosmos: A Spacetime Odyssey" presents the process of humankind's discovery of its origin and the origins of the Universe. From antiquity, through The Renaissance to modern times, the series reunites remarkable names from the history of science, persons who contributed to the progress of humanity and laid down the path for future generations to follow, generations who will bear the duty of preserving and carrying on the scientific heritage and culture left behind by our predecessors.

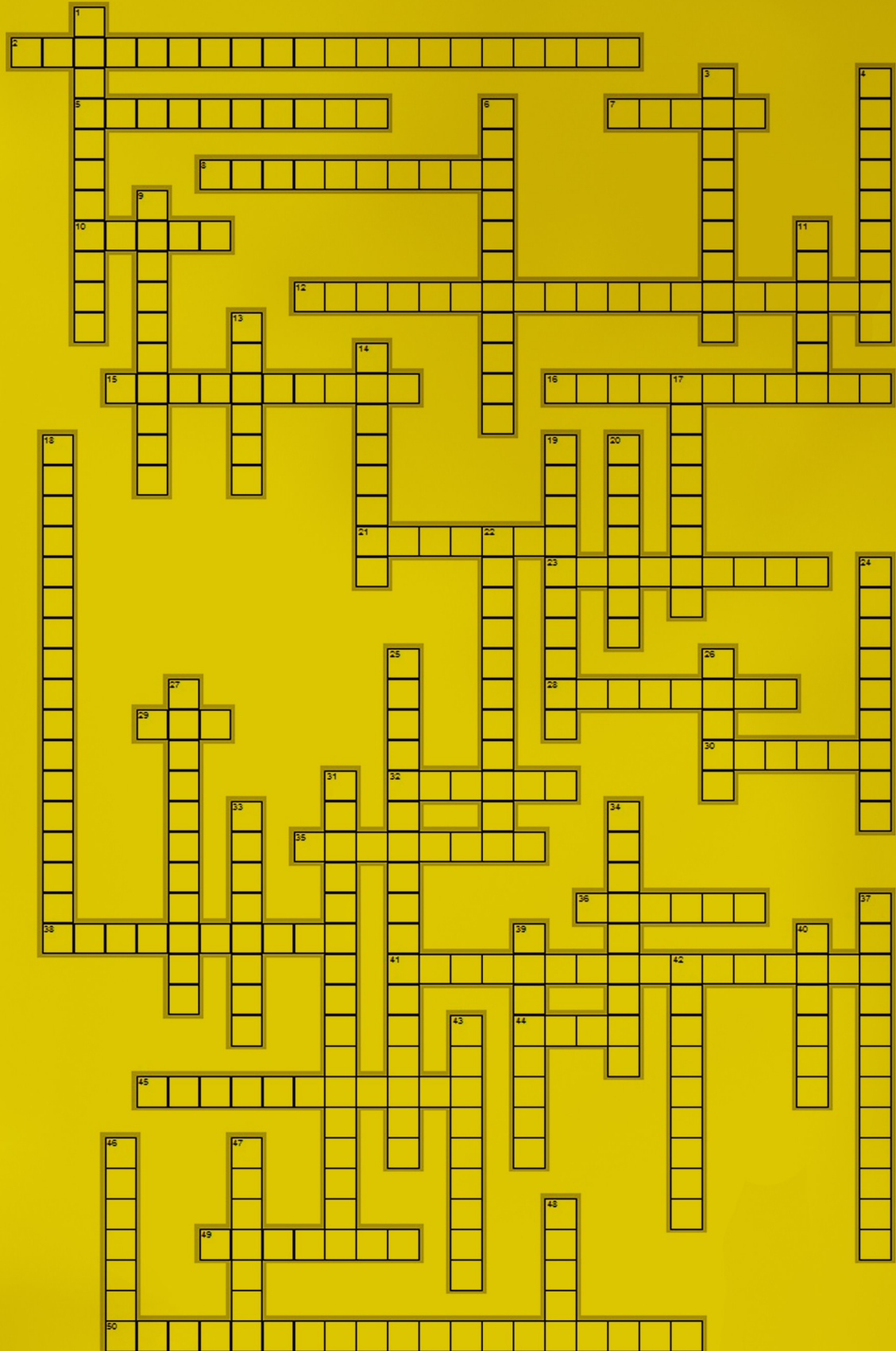
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 Gryboski, M. (2014, March 11) "Cosmos" Accused of Taking a Jab at Catholics. Retrieved from <http://www.christianpost.com/news/cosmos-accused-of-taking-a-jab-at-catholics-115976/>



Crossword

UNESCO World Heritage National Parks



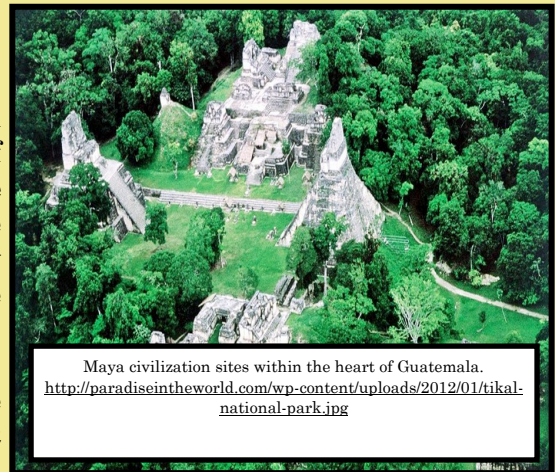
Ecological Diversity Ltd.

ACROSS

2. It is located east of Cuba, Holguín and Guantánamo provinces. It was named in honour of a German researcher who was on the island between 1800 and 1801. It has a complex geology that gave rise to ecosystems and species unmatched in the Caribbean, such as: the rose-throated parrot (*Amazona leucocephala*), the Cuban parakeet (*Aratinga euops*), the ivory-billed woodpecker (*Campephilus principalis*), the Cuban kite (*Chondrohierax wilsonii*), the Monte Iberia eleuth (*Eleutherodactylus iberia*), the bee Hummingbird (*Mellisuga helenae*), Gervais's funnel-eared bat (*Nyctiellus Lepidus*), the almiqui (*Solenodon cubanus*), the sea cow (*Trichechus manatus*).

5. Is the only national park in Malawi that was designed to protect fish and their habitats. There are hundreds of fish species in this park, nearly all of them endemic and they are important for the study of evolution.

7. In the jungle of Guatemala, surrounded by lush vegetation, lies one of the most important sites of the Mayan civilization, which existed between the 6th century BC and 10th century AD. Besides the tumultuous history of the place there are many species to be seen here, such as the black-handed spider monkey (*Ateles geoffroyi*), Morelet's crocodile (*Crocodylus moreletii*), the ocelot (*Leopardus pardalis*), *Leopardus wiedii*, the jaguar (*Panthera onca*) and the eyra cat (*Puma yagouaroundi*).



Maya civilization sites within the heart of Guatemala.
<http://paradisetheworld.com/wp-content/uploads/2012/01/tikal-national-park.jpg>

8. The park is located in Nepal and covers an area of 1,148 km², most of it being in the Himalayan Khumbu region, near the border with the Tibet Autonomous Region. It was named after the Nepalese name for Mount Everest.

10. It is a park, but also a natural reservation in eastern Tajikistan, which is the longest glacial valley outside the polar region. This area includes flora species from both the south-west and center regions of Asia. Also, the park is home to rare mammals such as the snow leopard (*Panthera uncia*), the Siberian ibex (*Ovis sibirica*) and the Marco Polo sheep (*Ovis ammon polii*)

12. National Park which presents marine terraces associated with the continuous development of karst, which is a global example of geomorphic features and ongoing geological processes. This park is located in southeast Cuba around Cabo Cruz.

15. A National Park on the island of Borneo in Malaysia, which is important both for biodiversity and for its karst features. It has one of the largest central room, Sarawak,

which is 600 meters long by 415 meters wide and 80 meters high, being the highest in the world.

16. Park located off the Pacific coast of Costa Rica, being the only island in the eastern Pacific with tropical forest. The park's underwater world became famous thanks to divers who have concluded that it is the best place to see species such as the bigeye thresher (*Alopias superciliosus*), the blue whale (*Balaenoptera musculus*), the humpback whale (*Megaptera novaeangliae*), the green sea turtle (*Chelonia mydas*), the hawksbill sea turtle (*Eretmochelys imbricata*).
21. At the foot of the Himalayas are some of the few undisturbed remains in the Terai region which formerly extended to Nepal and India. This park is one of the refuge areas of the Bengal tiger (*Panthera tigris tigris*).
23. It is the oldest park in New Zealand and the fourth in the world. It lies in the center of the north of the island and there are three active volcanoes in the park: Tongariro (1.968 metres), Ngauruhoe (2.291 metres) and Ruapehu (2.797 metres).
28. Located in the heart of California, with numerous waterfalls, glacial lakes, glacial moraines and valleys in the form of "U", the park offers an overall picture of all types of granite formations, harboring species such as the western toad (*Anaxyrus boreas*), the Yosemite toad (*Anaxyrus canorus*), the pallid bat (*Antrozous pallidus*), the mountain beaver (*Aplodontia rufa*), the coyote (*Canis latrans*), the big brown bat (*Eptesicus fuscus*), the skunk bear (*Gulo gulo*), the snowshoe rabbit (*Lepus americanus*) and the white-tailed jackrabbit (*Lepus townsendii*).
29. It is a national park in the Ivory Coast containing one of the last areas of virgin rainforest in West Africa. Flagship species such as the pygmy hippo (*Choeropsis liberiensis*), the African elephant (*Loxodonta africana*), the leopard (*Panthera pardus*), the Jentink's duiker (*Cephalophus jentinki*), the zebra duiker (*Cephalophus zebra*), the western black-and-white colobus (*Colobus polykomos*), the giant pangolin (*Smutsia gigantea*).
30. A national park located in northern Argentina, on the border with Brazil, being a natural frontier, known for its semi circular waterfall in the heart of the reservation which is 80 metres high and 2.700 metres in diameter. The river on which the waterfall is set is named the "great water" by the locals and is surrounded by a subtropical forest that houses 2.000 vascular plants and animals such as the tapir (*Tapirus spp*), the giant ant (*Myrmecophaga tridactyla*), the howler monkey (*Alouatta seniculus*), or the ocelot (*Leopardus pardalis*).

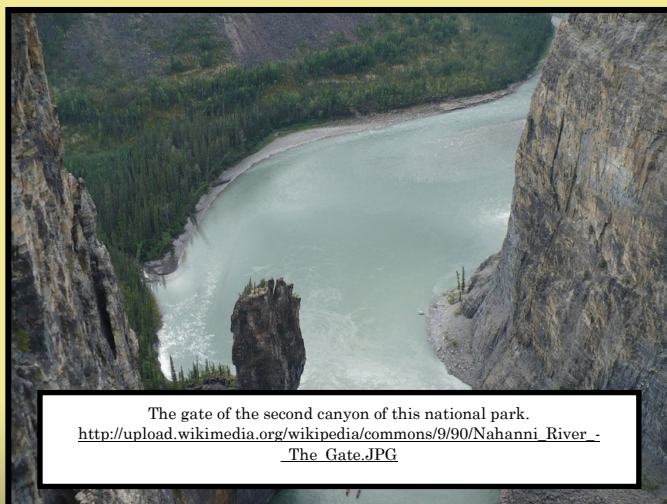


32. It is the largest national park in Australia, which retains the largest variety of ecosystems of the Australian continent, including large areas of savannah, open forests, floodplains, mangroves, marsh terraces, coastal and monsoon forests.
35. This national park is given the name of a mountain located in north-western Montenegro, was formed by glaciers and is crossed by numerous rivers and groundwater. The deepest gorges in Europe are along the Tara River canyon.
36. The park is located in Panama, representing a bridge between two continents and contains an exceptional variety of habitats: sandy beaches, rocky coasts, mangrove forests, tropical and mountainous forests. It also contains remarkable wildlife: the black howler monkey (*Alouatta pigra*), the northern owl monkey (*Aotus trivirgatus*), the Colombian spider monkey (*Ateles fusciceps ssp. rufiventris*), the mocondo (*Cavanillesia platanifolia*), the American crocodile (*Crocodylus acutus*), the lowland paca (*Cuniculus paca*), the Central American agouti (*Dasyprocta punctata*), the harpy eagle (*Harpia harpyja*), the capybara (*Hydrochoerus hydrochaeris*), the white mangrove (*Laguncularia racemosa*).
38. In addition to being a national park, it is also a natural reserve for the Bengal tigers (*Panthera tigris tigris*) in West Bengal in India.

41. It is located in the Caribbean in the Dominican national park and it's called "the mountain with three peaks" by the locals. It has a lush rainforest, combined with spectacular volcanic features with steep slopes and deeply incised valleys, hot springs and five volcanoes.



44. The park is marked by spectacular stone pillars that reach a height of about 100 metres, situated along the banks of the Lena River in the central part of the Republic of Sakha (Yakutia). They were produced by extreme continental climate in the region, with an annual temperature range of almost 100 degrees centigrade, -60 °C in winter to + 40 °C in summer.

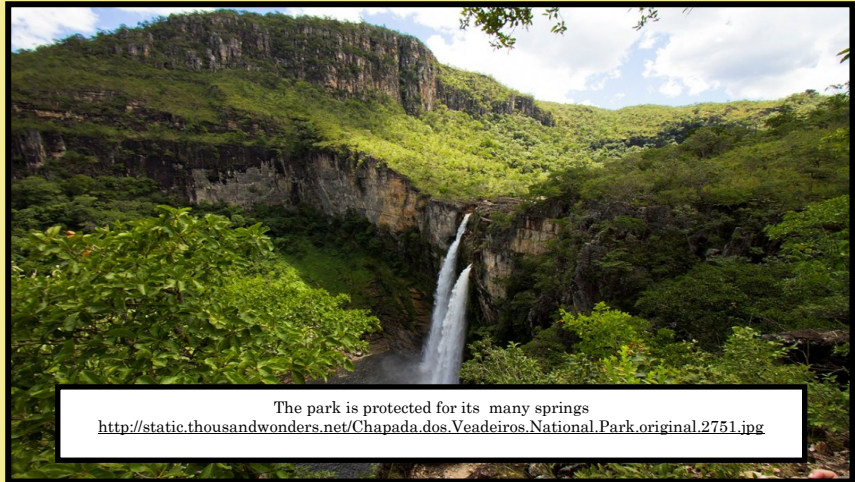


45. This park protects the most massive volcano and the highest mountain in Africa, the top of this giant whose name the park bears reaches 5895 meters. This mountain is a superlative natural phenomenon, being isolated from all sides by savannah.

49. Situated along a river that bears its name is one of the most spectacular rivers in Canada, but especially North America. This park contains deep canyons and huge

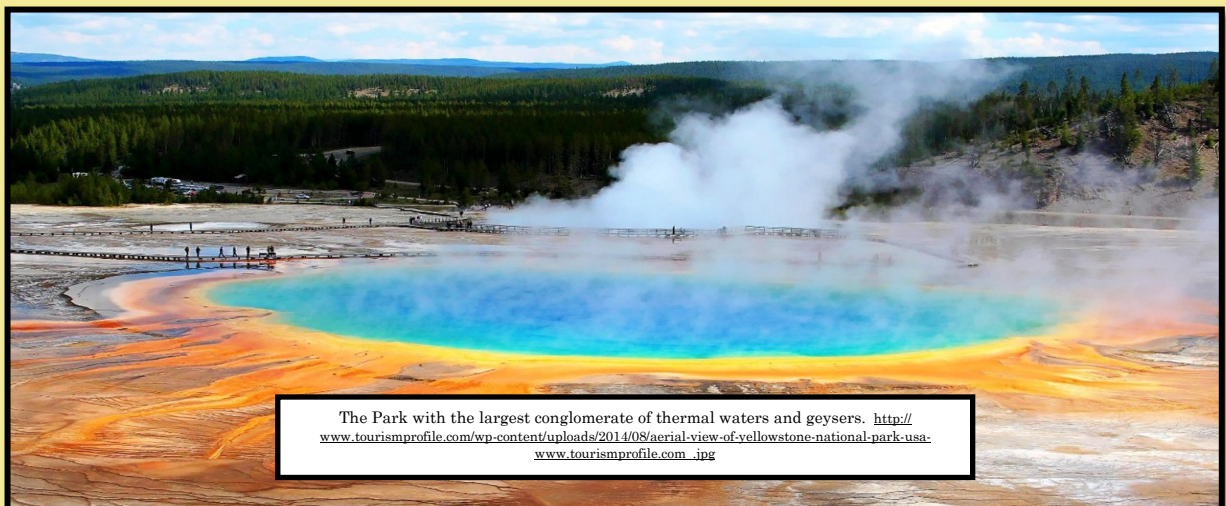
waterfalls, as well as unique limestone caves. There are animals such as the moose (*Alces alces*), the golden eagle (*Aquila chrysaetos*), the American beaver (*Castor canadensis*) and the Dall's sheep (*Ovis dalli*) in this park.

50. It is situated on a plateau in the state of Goiás in Brazil. It was declared a national park on January 11th, 1961 in order to protect sources and the system of streams, the park being host of 655 springs on an area of 2,365 km².



DOWN

1. It is one of the most famous parks of the United States of America because it contains half of all the world's geothermal features, with more than 10,000 examples. Also there is the largest concentration of geysers in the world in this park, two thirds of all the geysers in the world. Species found in this park are the moose (*Alces americanus*), the tiger salamander (*Ambystoma tigrinum*), the American bison (*Bison bison*), the coyote (*Canis latrans*), the wolf (*Canis lupus*).



3. In the heart of Assam, this park is one of the last areas in eastern India undisturbed by human presence. It is inhabited by the largest populations of Indian Rhinoceros (*Rhinoceros unicornis*) in the world, the Indian water buffalo (*Bubalus Arne*) and the swamp deer (*Rucervus duvaucelii*).

4. It is located in Peru and covers a large part of the Great Dividing Blanca, the highest tropical mountain range in the world. It has 27 snow-capped peaks, most of them being 6.000 metres tall, the largest being El Huascaran which rises 6.768 metres.
6. The park contains the largest gorge in the world. The gorge was carved by the Colorado River and has about 1500 meters deep. Its horizontal layers restore the geological history of the last two billion years. Furthermore, there have been found prehistoric traces of human adaptation to the environment in the area.
9. This National Park is located south-west of the island of Java. The park is of geological interest due to volcanoes and is the last refuge of Javan rhinoceros (*Rhinoceros sondaicus*).
11. It is a natural reservation in Andalusia, southern Spain, which is known for its diversity of habitats: lagoons, marshes, movable and immovable dunes, maquis shrublands. The park holds the following endangered animal species: the Iberian lynx (*Lynx paradinus*), the Iberian imperial eagle (*Aquila adalberti*), the marbled duck (*Marmaronetta angustirostris*) and the white headed duck (*Oxyura leucocephala*).



13. It is located in Morona Santiago, Chimborazo and Tungurahua, provinces of Ecuador. There are two active volcanoes in the park: Sangay and Tungurahua and an inactive volcano named El Altar.

14. It is the oldest national park in South-east Europe and the largest national park in Croatia. The waters have been flowing over the limestone for over thousands of years, creating natural dams which in turn have created a series of lakes, caves and waterfalls, a geological process that

continues to this day.

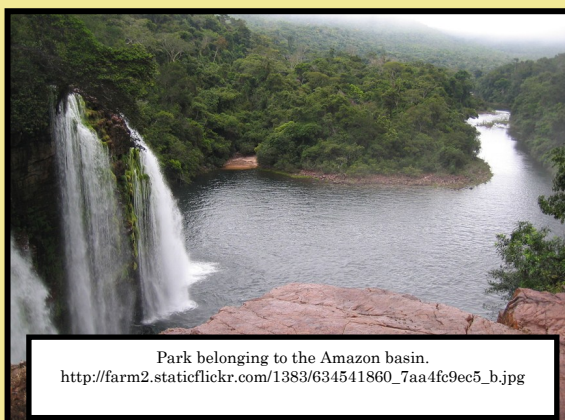
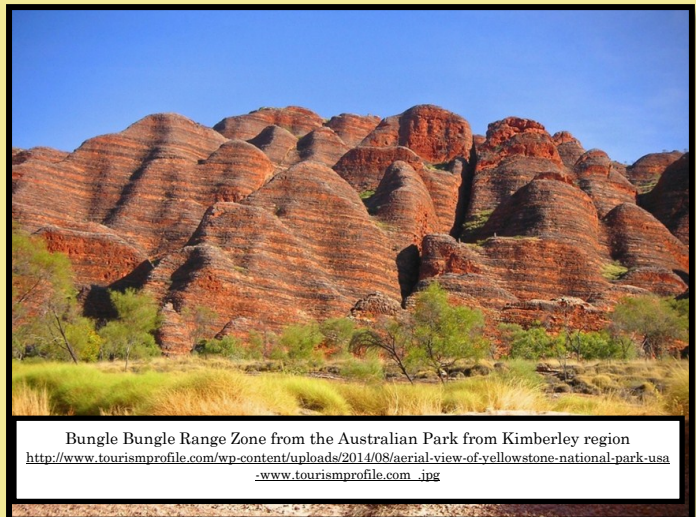
17. It is the most westerly point of the Australian continent and has three exceptional features: the largest areas of seagrass in the world, the presence of the sea cow (*Dugong dugon*) and Stromatolites, colonies of cyanobacteria that form hard deposits.



18. Due to glaciers, waterfalls and lakes, this alpine area is one of the most beautiful regions of Africa, the park being located in Uganda. Species of plants and animals representative of the area: the Ruwenzori river frog (*Amietia ruwenzorica*), the bamboo warbler (*Bradypterus alfredi*), *Carex runssoroensis*, the Ruwenzori black-fronted duiker (*Cephalophus nigrifrons ssp. rubidus*), the Stuhlmann's blue monkey (*Cercopithecus mitis ssp. stuhlmanni*).

19. In this park in Kenya there is a dormant volcano that during its activity, 3.1 to 2,6 million years ago, is supposed to have increased by approximately 6.500 meters. Also, there is a traditional route of migration of African elephants (*Loxodonta africana*) in this park.
20. The park is located in the region of West Papua New Guinea in Indonesia and is the largest protected region in Southeast Asia. It is the only park in the equatorial region where glaciers reach the sea. It contains lowland regions with mangrove swamps and mountainous regions with subalpine vegetation.
22. It is located on the plains of the north-central region of Canada and is home to the largest population of wild bison in North America. It is also the nesting place of the whooping crane (*Grus americana*), which is an endangered bird, and in May of 2011 there were 279 birds in the park.
24. The park is located in the Kimberley region of Western Australia, which includes the Bungle Bungle Range area that has spectacular scenery with rocks carved like a beehive, and is surrounded by savannah.

25. It is the largest and most intact national park in the Amazon Basin showing the evolutionary history dating back over a billion years, since the Precambrian. There are numerous species of protected reptiles here that can be found on CITES, such as the green anaconda (*Eunectes murinus*), the yellow anaconda (*Eunectes notaeus*), the black caiman (*Melanosuchus niger*), the Yacare caiman (*Caiman yacare*), the yellow-spotted Amazon river turtle (*Podocnemis unifilis*).



26. A National Park which is located in southwestern Bulgaria comprising a part of the Pirin Mountains. Within the park there are two natural reservations: Bayuvi Dupki- Djindjirita, one of the oldest in the country, and Iulen.

27. Located in Kentucky, the park features the largest network of natural caves and underground passageways in the world, which are characteristic examples of limestone

formations. In this network of caves many species of bats have their habitat: the Indian bat (*Myotis Sodalis*), the gray bat (*Myotis grisescens*), the little brown bat (*Myotis lucifugus*), the big brown bat (*Eptesicus fuscus*) and the tri-colored bat (*Pipistrellus subflavus*).



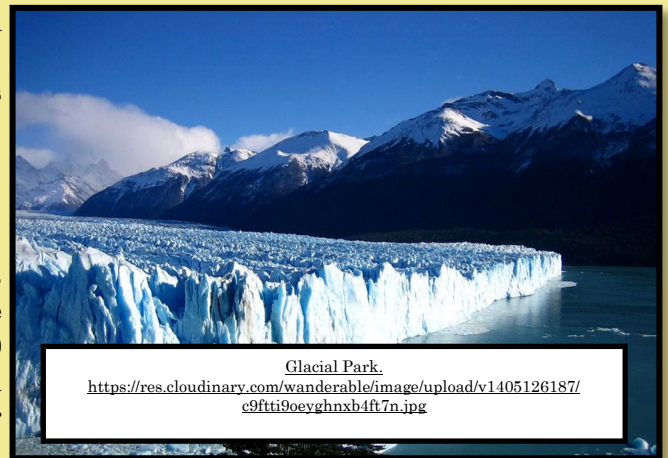
Pillars of the park located in China.
<http://funmozar.com/wp-content/uploads/2014/07/sanqingshan-2.jpg>

31. The park located in the western part of the mountain range in China Huyaiyu displays a unique range of afforestation due to the concentration of granite rocks shaped pillars and peaks: 48 peaks and 89 pillars, many of which resemble human or animal silhouettes.

33. It is among the top national parks in Malaysia and presents one of the most important biological sites in the world with more than 4,500 species of flora and fauna, including 326 bird species and about 100 species of mammals.

34. The Laurel Forest covers about 70% of this park located in the middle of the island of La Gomera in the Canary Islands Archipelago, Spain. The presence of numerous hot springs provides a rich vegetation, similar to that of Tertiary period which has disappeared from southern Europe due to climate change.

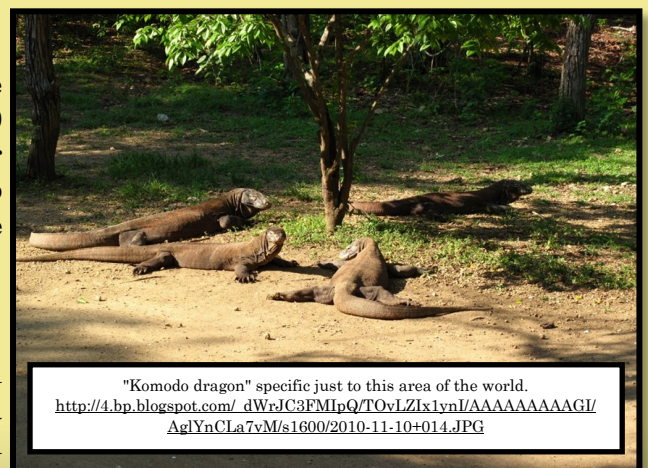
37. Glacial park located in the south-western Province of Santa Cruz in Argentina, which includes Lake Argentino that spans an area of 160 kilometres.



Glacial Park.
<https://res.cloudinary.com/wanderable/image/upload/v1405126187/c9ftti9oevghnxb4ft7n.jpg>

39. A park in Bharatpur, Rajasthan in India, which is an avifauna sanctuary that hosts thousands of birds especially during the winter season. Currently more than 230 bird species were known to be present in the park at one time. Also, it is a major tourist center for ornithologists.

40. These volcanic islands in Indonesia are inhabited by a population of around 5,700 giant lizards, whose aggressive behaviour gave them the name of "Komodo dragon" (*Varanus komodoensis*). These lizards are unique worldwide.

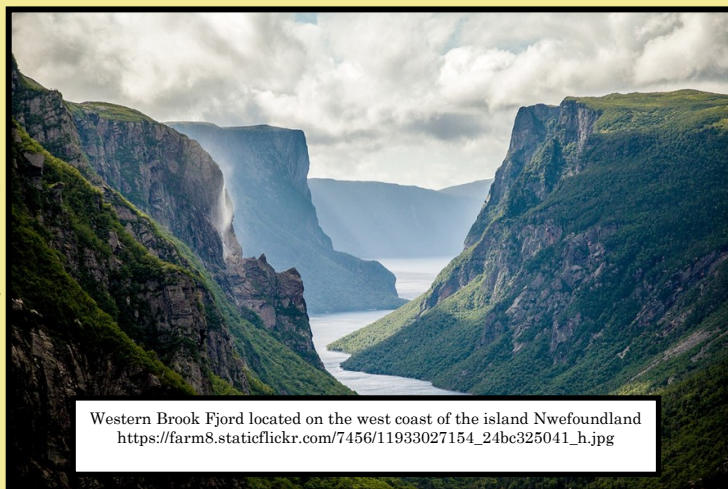


"Komodo dragon" specific just to this area of the world.
http://4.bp.blogspot.com/_dWvJC3FMipQ/TOvLZIx1ynI/AAAAAAAAAGI/AgYnCLa7vM/s1600/2010-11-10+014.JPG

42. It is located in a region of African savannah in northern Tanzania, east of Lake Victoria and stretches to the border in southern

Kenya. Large herds of migratory animals are continuously moving on the entire ecosystem, but they are most impressive in May and June, when the animals travel in masse from the central plains to the waterholes in the west.

43. The park is located on the west coast of the island of Newfoundland in Canada and offers a rare example of the process of collision of tectonic plates, where one can see the crust and mantle of the Earth united. Moreover, the phenomenon of glaciations offered spectacular scenery to the area, such as the alpine plateau, fjords, glacial valleys, steep cliffs, waterfalls and many lakes.



46. Located north-west of Washington State, the park is famous for the diversity of ecosystems, such as glacial peaks with alpine meadows, surrounded by a vast and old forest which is one of the best preserved tropical forests in the temperate zone of the Pacific North West.
47. It is located in south-eastern Venezuela, on the border with Brazil and Guyana. Sixty-five percent of the park is occupied by tepuy, mountains without a clear projection-type peak, in whose place is a flat plateau or mesa type that represents geological interest.
48. It is a national park located in Tenerife, in the Canary Islands, which has global importance in providing evidence of the geological processes that underpin the evolution of oceanic islands, being the oldest national park in Spain.

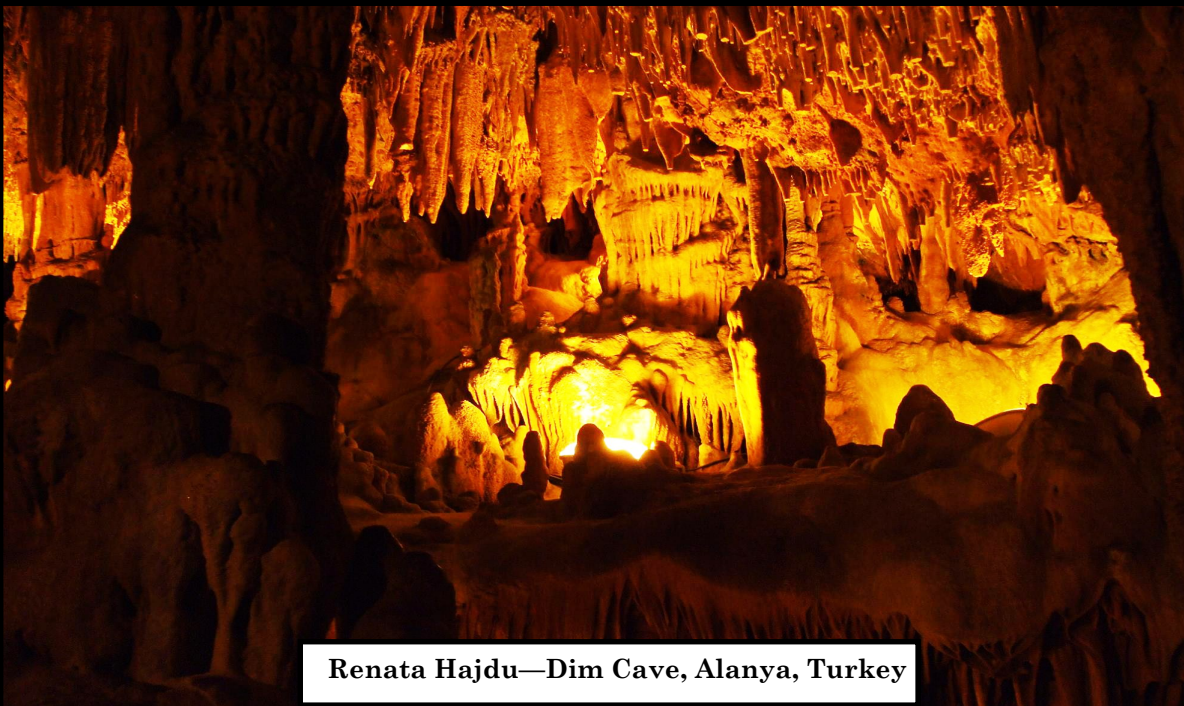
Made by: Milonean Maria-Adelina
Edited by: Rusu Dragoş
Webograpy: <http://whc.unesco.org/en/list>

PHOTO GALLERY

Nature in pictures, immortalised by students



Renata Hajdu—Skeleton, British Museum, London, England



Renata Hajdu—Dim Cave, Alanya, Turkey



Vlad Ursulescu— *Chaenomeles* sp.,
Cluj-Napoca



Vlad Ursulescu— *Viburnum carlesii*,
Botanical Garden “Alexandru Borza”,
Cluj-Napoca



Renata Hajdu— *Giraffa* sp., Yorkshire Wildlife Park, England



Renata Hajdu— *Papio sp.*(baboon),
Yorkshire Wildlife Park, England



Vlad Ursulescu— *Narcissus sp.* ,
Botanical Garden
„Alexandru Borza”,
Cluj-Napoca



Vlad Ursulescu— *Abies sp.* ,
Botanical Garden „Alexandru
Borza”, Cluj-Napoca



Vlad Ursulescu— *Pulsatilla vulgaris* ,
Botanical Garden "Alexandru Borza",
Cluj-Napoca



Vlad Ursulescu— *Helix pomatia*
(garden snail), Cluj-Napoca



Renata Hajdu— *Panthera tigris* (tigre), Yorkshire Wildlife Park, England



*”“The true delight is in the finding out rather
than in the knowing.”*

- Isaac Asimov