

Editors Column

Welcome to the 3rd edition of The Crystal Newsletter for 2017. We would like to extend our congratulations Mr Tony Lampard on receiving the P.H. Havilland Award!

We are pleased to announce that we have a NEW section in this edition that presents a selection of contributions and comments that have kindly been sent in by our readers.

Interesting articles include the 2017 Chisipite Science Fair, an update on the United Nations Climate Change Conference, a fascinating article on the earth's magnetic poles and one on how giant rats could help reduce wildlife trafficking. There are details about the educational Kids Club that is being run by COSMO on Saturday mornings on Monovale Vlei and an article on the new 'Wet-Land-Dry' Project being headed by Sharon Hook from Miracle Missions.

We welcome your comments and environmental contributions to the Editor on infor@blackcrystal.co.zw. If you no longer wish to subscribe to the Crystal then please email us with this instruction.

Thank you and happy reading!



Black Crystal Consulting is one of Zimbabwe's leading reputable companies offering a quality service in environmental and socioeconomic consultancy services. Black Crystal Consulting believes in ***caring for the environment beyond today*** to ensure that biodiversity is maintained and that natural resources are not depleted for the next generation.

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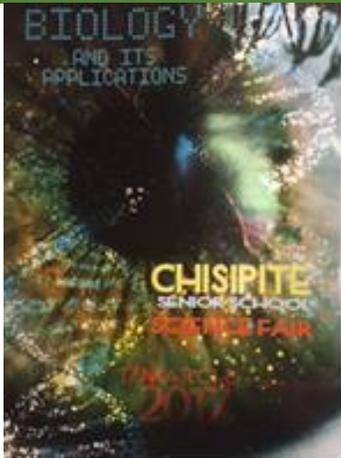
Congratulations to Tony Lampard

Black Crystal would like to congratulate Mr Tony Lampard on receiving the P.H. Havilland award from the Zimbabwe Institution of Engineers at a ceremony at Rainbow Towers in May. The award is presented to people who have made an outstanding contribution in the field of water engineering, irrigation or the prevention of water pollution and allied fields. Such contribution may be either in engineering or in administration and may arise from outstanding work in a person's field of employment.

Mr Lampard is the Managing Director of Paramark Limited which is one of Black Crystal's strategic partners. Paramark offers a range of Environmental and Occupational Health, Monitoring and Management services after it took over in entirety the Environmental and Occupational health and monitoring services formerly provided by Aptech Fluor Daniel (Consulting Engineers) when they closed their offices in Zimbabwe in 2000. Today Paramark is one of the few experienced organisations that offers these services. In collaboration with Black Crystal, Paramark have established a new service in sustainability reporting.

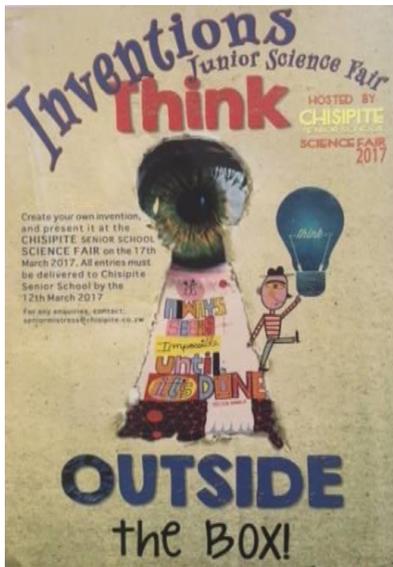
Mr Lampard is Chair of the Business Council for Sustainable Development Technical Committee (EMA) responsible for working with the local environmental protection agency in formulating appropriate environmental legislation and providing members with technical assistance for legal compliance. He also sits on the Standards Association of Zimbabwe Technical Committee for developing H12, the new standard for Hazardous Waste Management, and on the mirror committee for ISO26000 (the new International Standard being developed for Social Responsibility). Mr Lampard is accredited for ISO 14001 and OSHAS 18000 auditing.

Chisipite Science Fair 2017



Chisipite Senior School

'Biology and Its Applications' was the theme of this year's Science Fair at Chisipite High School. One of the main aims of the Fair was to encourage more students to appreciate STEM subjects and encompass disciplines such as physics, chemistry, computer science and art together. This year there were three new developments: firstly, schools that were unable to attend the Fair were invited to submit their entries in the form of video clips., Secondly, funding was secured to assist schools to participate by contributing to their transportation costs and lastly a new category was initiated: a Junior Science Fair for Grades 6 and 7 encouraging them to 'think outside the box'.



By 8.30am Chisipite High School was bustling with students from schools including Hellenic Academy, Oriel High Peterhouse High, Prince Edward High, Sharon, St John's High and Westridge High, all eager and excited to watch the presentations on the experimental projects from

the Lower and Upper 6 year groups and examine the posters from Grades 6 and 7 and Forms 3 and 4. What was good to see was the first time participation from schools such as Eaglesvale High School, Ellis Robin High School, Greystone Park Junior School, St Mary's High School, and Westridge High School.

The new junior class of poster's were particularly outstanding in terms of their scientific text, research, referencing, use of visual aids such as models, tables, charts, maps and photographs and good quality in terms of the overall presentation. Entries from Sharon School were: an 'Eco Friendly Farm' complete with a model.



An innovative poster entitled 'Litter Free Zimbabwe' presented the facts about e-litter. Another poster looked at how batteries could produce power using lemons, potatoes and tomatoes. The poster was accompanied by a working demonstration. One poster talked about a novel spray for feet called: 'Slip no More' and there was a large, very well presented and documented poster display on the Greystone Park Nature Reserve.



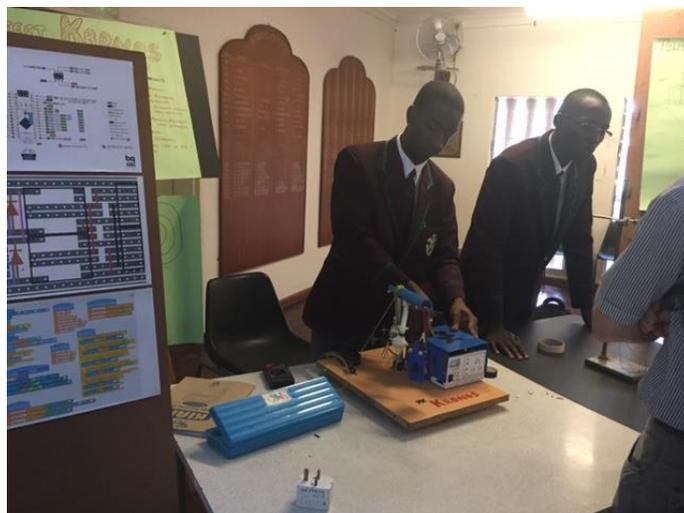
Some of the Form 3 and 4 posters cut across scientific disciplines such as 'Biological application to chemistry such as: The Formation of Nucleotide DNA' and one the

'Biological Application of Geography', 'Microbial Fuel Cell' and 'The biological Application of Physics' that looked at the eye as a camera. One poster explained how Stanford University scientists have invented a low-cost water splitter that uses a single catalyst to produce both hydrogen and oxygen gas which could provide a renewable source of clean-burning hydrogen fuel for transportation and industry and allow humans to breathe underwater at low cost.



Environmental themes were popular and project titles included: Destruction of the Environment and Solutions, 'Land Pollution', 'Solar Energy as a Clean Fuel', 'Waste to Watts' that looked at producing energy from waste, 'Early Warning Flood Systems' and 'Water Purification using *Moringa Oleifera*. Crushed *Moringa* seeds are both used to clarify and lower the bacterial concentration in water making it safe for drinking. It is an inexpensive cheap option and one that is kinder to the environment as it does not use any dangerous chemicals. Natural coagulants like this have been used for centuries in traditional water treatment practices throughout certain areas of the developing world.

'Bacterial Electricity: Dirt is Power' was an interesting project as was one about coral reefs and how fragile they are with respect to pollution and what we can protect them. The 'Bio Gas Generation' project was complete with a demo that demonstrated how a car tyre had been inflated using cow waste. Another project looked at 'Preventing Global Warming using Bioengineering' whereby two enormous shields installed in space, over the two poles would act as a 'sunshade' and halt global warming, the shields would also be covered in solar panels and produce power.



One school had established an educational website dedicated to the Fair theme. A fresh approach to urban farming using 'Vertical Farming' was explored. Vertical gardens are made from cheap or recycled materials, making them an easily affordable option for urban dwellers living in poverty to be able to grow sufficient food for their families despite the lack of arable land. One project entitled: 'Say 'Nose' to Paralysis' described how spinal paralysis can be treated by transplanting nasal olfactory cells into a damaged spinal cord. Cells in the olfactory bulb (where scent is processed) where the smell receptors are found, have a comparatively short life. They are continually getting replaced by new cells that also provide a 'mechanical memory' that also assist with spinal regeneration. Food was another topical and popular theme with posters that included: 'Food Additives', 'Fast Food Fetish', 'Calories and Health' and 'Healthy Home Made Heaven'.



The subjects of the both poster and projects categories demonstrated that students were clearly concerned with the environment and the food that they consume. It was especially impressive to see girls engaging in science.

This year's panel of Judges that generously gave their professional time and expertise to support the fair, were as follows: Dr. M Djordjevic (Specialist Oral Surgeon), Dr L Robertson (former pupil at Chisipite), Mr Frank Muzenda African Institute of Biomedical Science & Technology (AiBST) Wilkins Hospital, Ms C Griffiths (BSc (Hons) Limnology), Mrs S Waterworth (BSc (Hons) Environmental Studies and Biology, C.Env), Sara Whaley, Scott Richardson, Mr Tim Bacon and Mr Paul Walhurst (part of last year's winning team).

All the competitors were congratulated and praised for their entries and all their hard work. Here are details of the winning posters and projects:

Posters: Grades 6 and 7: Junior class

'The Greystone Park Project', Chisipite Junior School.

Posters: Forms 3 and 4

First prize: 'Save the Earth: Do Something' by Megan Whyte, Hellenic Academy.

Second prize: '3D Printing' by Humaira Tadiwa and Fari Khatija, Chisipite High School

Third prize: 'Fast Food Fetish' by Peterhouse Girls High School.

Projects: Lower and Upper 6

First prize: 'The Photo House Effect' by St John's Emerald Hill

Second prize: 'Microbial Fuel Cell' by St Johns College

Third prize: 'Musical Therapy' by Chisipite High School

In addition the judges were so impressed with the originality of three projects all submitted by St Mary's High School that they gave commendations for the following projects: Use and dangers of Recreational Drugs in Schools, Organic Fungicide (onions and garlic) and a project on Drainage.

The Fair highlighted the importance of science and Mrs Susan Mahachi, Senior Science Chemistry and Physics Teacher, who originally established the annual event, is to be commended for the positive impact that it will have on students. The exhibition showcased just how much science is an exciting, rewarding and interesting career choice. If your school would like to participate in the 2018 Science Fair then please kindly contact Mrs Mahachi on e-mail: wmahachi2gmail.com.

Are The Earth's Magnetic Poles About to Flip?

The Earth's giant magnetic field surrounds our planet like an invisible force field – protecting life from harmful solar radiation by deflecting charged particles away. The magnetic field changes shape due to the planet's north and south magnetic poles as well as the solar wind (the steady stream of particles coming from the sun). Our planet's history includes at least several hundred global magnetic reversals, where north and south magnetic poles swap places.

So when's the next one happening and how will it affect life on Earth?

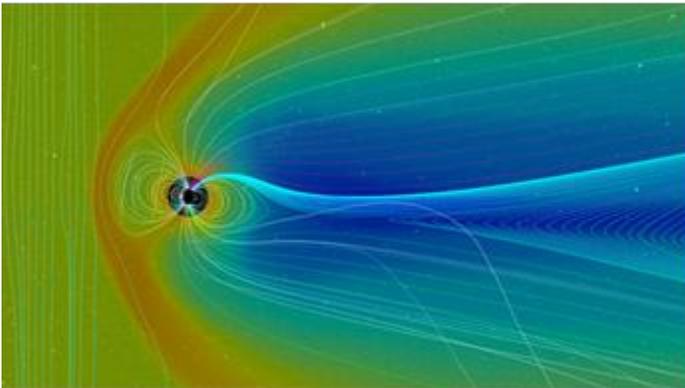
During a reversal the magnetic field won't be zero, but will assume a weaker and more complex form.

It may fall to 10% of the present-day strength and have magnetic poles at the equator or even the simultaneous existence of multiple "north" and "south" magnetic poles. Geomagnetic reversals occur a few times every million years on average. However, the interval between reversals is very irregular and can range up to tens of millions of years.

There can also be temporary and incomplete reversals, known as events and excursions, in which the magnetic poles move away from the geographic poles – perhaps even crossing the equator – before returning back to their original locations. The last full reversal, the Brunhes-Matuyama, occurred around 780,000 years ago. A temporary reversal, the Laschamp event, occurred around 41,000 years ago. It lasted less than 1,000 years with the actual change of polarity lasting around 250 years.

Power cut or mass extinction?

The alteration in the magnetic field during a reversal will weaken its shielding effect, allowing heightened levels of radiation on and above the Earth's surface. Were this to happen today, the increase in charged particles reaching the Earth would result in increased risks for satellites, aviation, and ground-based electrical infrastructure. Geomagnetic storms, driven by the interaction of anomalously large eruptions of solar energy with our magnetic field, give us a foretaste of what we can expect with a weakened magnetic shield.



Credit: NASA's Scientific Visualization Studio

In 2003, the so-called Halloween storm caused local electricity-grid blackouts in Sweden, required the rerouting of flights to avoid communication blackout and radiation risk, and disrupted satellites and communication systems. But this storm was minor in comparison with other storms of the recent past, such as the 1859 Carrington event, which caused aurorae as far south as the Caribbean.

The impact of a major storm on today's electronic infrastructure is not fully known. Of course any time spent without electricity, heating, air conditioning, GPS or internet would have a major impact; widespread blackouts could result in economic disruption measuring in tens of billions of dollars a day.

In terms of life on Earth and the direct impact of a reversal on our species we cannot definitively predict what will happen as modern humans did not exist at the time of the last full reversal. Several studies have tried to link past reversals with mass extinctions – suggesting some

reversals and episodes of extended volcanism could be driven by a common cause. However, there is no evidence of any impending cataclysmic volcanism and so we would only likely have to contend with the electromagnetic impact if the field does reverse relatively soon.

We do know that many animal species have some form of magnetoreception that enables them to sense the Earth's magnetic field. They may use this to assist in long-distance navigation during migration. But it is unclear what impact a reversal might have on such species. What is clear is that early humans did manage to live through the Laschamp event and life itself has survived the hundreds of full reversals evidenced in the geologic record.

Can we predict geomagnetic reversals?

The simple fact that we are "overdue" for a full reversal and the fact that the Earth's field is currently decreasing at a rate of 5% per century, has led to suggestions that the field may reverse within the next 2,000 years. But pinning down an exact date – at least for now – will be difficult.

The Earth's magnetic field is generated within the liquid core of our planet, by the slow churning of molten iron. Like the atmosphere and oceans, the way in which it moves is governed by the laws of physics. We should therefore be able to predict the "weather of the core" by tracking this movement, just like we can predict real weather by looking at the atmosphere and ocean. A reversal can then be likened to a particular type of storm in the core, where the dynamics – and magnetic field – go haywire (at least for a short while), before settling down again.

The difficulties of predicting the weather beyond a few days are widely known, despite us living within and directly observing the atmosphere. Yet predicting the Earth's core is a far more difficult prospect, principally because it is buried beneath 3,000 km of rock such that our observations are scant and indirect. However, we are not completely blind: we know the major composition of the material inside the core and that it is liquid. A global network of ground-based observatories and orbiting satellites also measure how the magnetic field is changing, which gives us insight into how the liquid core is moving.

The recent discovery of a jet-stream within the core highlights our evolving ingenuity and increasing ability to measure and infer the dynamics of the core. Coupled with numerical simulations and laboratory experiments to study the fluid dynamics of the planet's interior, our understanding is developing at a rapid rate. The prospect of being able to forecast the Earth's core is perhaps not too far out of reach.

Source: Phil Livermore and Jon Mound, University of Leeds

The COSMO Kids Club

The Conservation Society of Monavale runs COSMO Kids Club for children in the community on Saturday mornings, on the Vlei. Children learn about wetlands and water, the plants and animals on the wetland, about other environmental concerns such as waste management and how to plant vegetable home gardens.



This well known club also provides a model for other communities to follow. Other activities include a monthly bird walk conducted by BirdLife Zimbabwe on the Vlei; School groups visit for walks and training on our wetland functions and services and to experience the wetland; university students undertake under graduate and post graduate research on the wetland and community organizations visit the wetlands for awareness walks

For more information on the COSMO Trust, follow this link <http://wli.wwt.org.uk/2017/04/members/monavale-vlei-ramsar-site-2107/>

Source: Dorothy Wakeling

How Giant Rats Could Help End Wildlife Trafficking

Wildlife officials in Tanzania are training African giant pouched rats to help identify illegal shipments of pangolins, a heavily trafficked endangered species. Funded through the U.S. Fish and Wildlife Service (FWS) as an effort to end wildlife trafficking, this program is currently assessing the rats' ability to sniff out pangolins in various settings. If the rats are successful, they will eventually work in shipping ports to locate pangolins that have been illegally captured and locked up in shipping containers. Pangolins are an endangered species and the most illegally trafficked mammal on the planet. Their scales are ground up for use in traditional Chinese "medicine" and their meat is considered to be a high-end delicacy and status symbol in some areas of Asia.

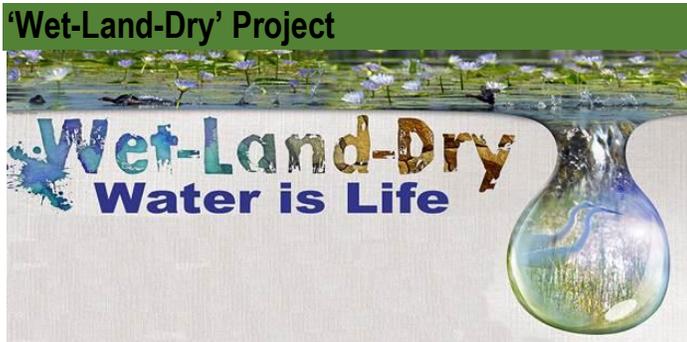


Despite pangolins being protected by an international trade ban, their populations continue to plummet as poachers relentlessly capture them for the black market. The only strategy pangolins have to protect themselves is to curl up into a ball and expose their tough outer scales. This helps with their natural predators, but makes them an extremely easy target for poachers who can simply pick them up and walk off with them. That's where the rats come in. The goal for these surprisingly intelligent rodents is to locate pangolins packed away in hidden shipping containers before they're sent off to be sold to the Asian black market. While dogs usually come to mind for this sort of work, rats are less expensive to train and care for, and easier to

transport. Officials believe that these enormous three-foot-long rats are perfect for the job as they've been so successful in other similar endeavors. This species is also used to sniff out landmines in Cambodia and test tuberculosis samples in Mozambique!

Source:

<https://thelivingstoneweekly.files.wordpress.com/2017/03/tlbw8mar17-compressed.pdf>



On World Water Day, 22nd of March 2017, the Wet-Land-Dry Project was officially launched at Town House in Harare. The project is the fourth of a series of similar environmental and artistic initiatives spearheaded by the Italian Embassy since 2014. The diverse group of partners for this year's project includes The Embassy of the Federal Republic of Germany, the Embassy of Sweden, the European Union, the City of Harare, UNESCO, Miracle Missions, Meikles Hotel and Meikles Foundation, BirdLife Zimbabwe & The Harare Wetlands Trust, UNICEF, Mukuvisi Woodlands, Discovereum Children's Museum Zimbabwe and Enviro Experts Africa.

This multi-partner initiative seeks to raise awareness of the importance of sustainable water consumption and management as well as the crucial protection of our wetlands. The recent swing between too little and too much rain, drought and flood has brought the fragility of Zimbabwe's environment to everyone's attention. Creating awareness about it is key to the solution. **Water is life.**

The project will run over three months and features two main activities:

- A Primary and Secondary schools competition, which invites children to submit their ideas, in the form of a project or drawing, on how to better preserve our environment and utilise water.

- The artistic decoration of a prominent city landmark such as the fountain in Africa Unity Square. This will serve as a reminder to every one of the importance of advocating good water management practices.

Due to lack of water and bad maintenance, the water system is no longer working in two of the three fountains and the costs of repairs would be too high for the tentative budget. Therefore the project is planning to convert one of the rectangular shaped side ponds into an eye-catching garden and the central fountain into a work of art.



The central fountain will be painted by eight renowned Zimbabwean artists, with the assistance of Academy students. One of the two long rectangular pools will be converted into a water-wise garden featuring low maintenance aloes, succulents and indigenous plants. The second pond will have to undergo minor repairs to allow it to function as a bird bath.



Efforts are being made to garner support from the surrounding businesses, not only for the project, but also to ensure the maintenance of the entire square once the painting and planting project has been completed.

If you would like to be involved in this innovative project please contact Mrs Sharon Hook on:

Email: hooknook@yoafrica.com

Mobile Phone: +263 772 240 442.

Readers' Comments

I read your April edition. It had interesting stuff. I hope the Judgement will be in the favour of The Borrowdale Residents and Ratepayers Association (BRRA) otherwise by 2020 there will be no wetland left in Zimbabwe! I do not know how best we can educate people to care for the environment. I stay in Chitungwiza and I once went to Dema, I saw a black thick cloud of smoke coming from that diesel power plant. I was left dumbfounded by what I had witnessed. I do not understand how the Minister of Environment allowed such a project to kick off. On the other hand, last year there was an improvement for commuters who use combis, as the owners of these combis had put some bins in their commuter omnibuses. Some passengers were no longer throwing litter through the windows. It appears now that the police, are no longer inspecting to see whether each commuter omnibus has a bin or not. Some combis no longer have these bins. We have a big task to educate other people about the environment. I believe our national media is not really helping in this department. Though there are fines for dumping rubbish in undesignated areas, I have never heard anyone who got fined for doing so. The ministry of environment together with the council should work hand in hand to protect our environment.

Ms Ruvimbo Munatsi

Fantastic report! Very noble idea indeed, looking forward to the next edition.

Tatenda Manyuchi

Thank you. I like the vertical garden ideas.

Victoria M Kajengo

Enjoyed reading articles and learnt a lot. Cartoon on back page very good.

Fr Nigel Johnson SJ

Morocco Climate Change Conference 2016

The United Nations Climate Change Conference was an international meeting of political leaders and activists to discuss environmental issues held in Morocco in November 2016. The conference incorporated the twenty-second Conference of the Parties (COP22), the twelfth

meeting of the parties for the Kyoto Protocol (CMP12), and the first meeting of the parties for the Paris Agreement (CMA1).

The conference was presided over by Salaheddine Mezouar, the Moroccan Minister for Foreign Affairs and Cooperation.



MARRAKECH 2016
COP22 | CMP12 | CMA1
 UN CLIMATE CHANGE CONFERENCE

The participants in the conference are members of the United Nations Framework Convention on Climate Change (UNFCCC) who work together to come up with global solutions to climate change.

The Objective of COP22

Each COP decides on how to combat climate change and reduce greenhouse gas emissions. Each year a different theme is chosen and focused on. The aim of the 2016 conference was ways to prevent "dangerous human interference with the climate system" and it dealt mainly with water management and decarbonizing energy supplies.

African Dimension to COP22

On the margins of COP22, a summit involving "around 30 African heads of state" took place which focused primarily on climate negotiations, in the backdrop of Africa being the part of the world that is the most threatened by global warming. On a more local note, the city of Marrakesh also took the opportunity to create for itself a greener image; for

example, it has provided 300 bicycles for public use as part of a municipal bicycle-sharing scheme.

Presentation of SuRe – The Standard for Sustainable and Resilient Infrastructure

On 14 November, the Swiss Global Infrastructure Basel Foundation (GIB) presented the newly launched SuRe – The Standard for Sustainable and Resilient Infrastructure at the Climate Summit for Local and Regional Leaders. GIB participated in a dialogue on “financing the sustainable transition of territories” to contribute to the Marrakech Roadmap for Action definition.

Water Management and Conservation Forum

Detailed issues relating to water transportation, infrastructure in the context of water storage, sustainable distribution, innovation for conservation, and accelerating efforts for new technologies were discussed.

De-carbonization of Energy Supplies Keynote Panel

The utilization of renewable resources, how policy can be used to promote renewable markets, and how infrastructure can be improved to accommodate these changes was discussed.

Accelerating Urban Mobility Forum

Mobility, especially sustainable public transportation, was the main focus of this forum. The main goal was to identify innovate ways public transportation could become zero emission.

Financing Climate Action Closing Keynote Panel

This panel discussed promoting new green products in relation to finance, while also incorporating climate considerations throughout economic systems.

Low Carbon Innovation in Emerging Regions Keynote Panel

This panel discussed how low emission technology can be integrated within existing infrastructure, how policymakers can implement technology safely, and how the UNFCCC can aid local businesses in the transition to green energy.

Sustainable Business as a Driver of Change

This forum developed ideas on how to create business models that left a minimal carbon footprint on the earth.

Impacting Innovation: Accelerating Green Academic Growth

This forum discussed how new technologies and innovations must showcase environmentally friendly and sustainable attributes. Additionally, they should help create green jobs and also be able to be incorporated into already existing markets.

Criticisms and setbacks of the conference

The inclusion of fossil fuel lobby groups with observer status, including the World Coal Association, the Business Council of Australia, Business Europe, and the Business Roundtable, was met with criticism. Analysts suggested the election of Donald Trump in the 2016 United States Presidential race impeded efforts at the congress due to his regressive views on climate change.

Environmental campaigners argued that the Conference was "heavy on rhetoric and light on real progress." The Conference in Paris the year prior was seen as one that provided a foundation for future progress, with the succeeding event in Marrakesh supposed to be turning those promises into action. Additional criticisms depicted the less developed countries as not receiving enough money in order to help them adapt to "changes that are already happening because of global warming."

Source:

https://en.wikipedia.org/wiki/2016_United_Nations_Climate_Change_Conference

