IMA NEWS

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Tobago's Next-Generation Scientists

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FOR MARINE CONSERVATION

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Tobago's Next- Generation Scientists

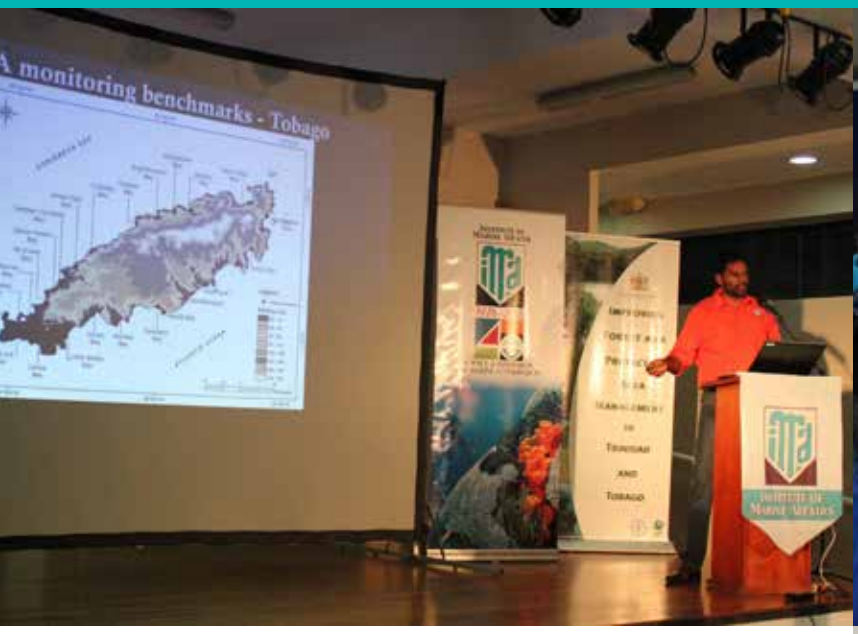
Students, teachers and other invited guests at the School Symposium

Our research symposium is a major information-sharing event which serves primarily to inform our many stakeholders of some of the key issues facing the marine environment. The Institute of Marine Affairs (IMA), in collaboration with the Improving Forest and Protected Area Management in Trinidad and Tobago (IFPAMTT) project, which is overseen by the Food and Agriculture Organisation of the United Nations (FAO/UN), held a two day community Symposium on 29th & 30th of October 2018 in Tobago. The Symposium themed **'Transforming Tobago; Understanding and Conserving our Natural Ecosystems'** engaged persons of the Betsy's Hope Community in a Fish Broth and Talk, which highlighted the research undertaken by the IMA, the IFPAMTT Project and other stakeholders. The evening's social settings allowed for presenters and community members to effectively share information on pertinent environmental issues such as the Sargassum seaweed and the Lionfish invasion affecting Tobago over a delicious fish broth.

Other topics included coastal erosion, the status of Tobago's coral reefs and the importance of terrestrial and marine protected areas.

The following day brought students of various secondary schools together at a special School Symposium, which was held at the Tobago Library Services – NALIS, in Scarborough. Students were presented with the many sciences behind conservation and multiple career paths for youths who are environmentally conscious. Events were quite memorable as proceedings included the animated presentation of Councillor Kwesi DesVignes, Secretary of Infrastructure, Quarries and the Environment of the Tobago House of Assembly, who challenged one student participant to join him onstage to perform trendy dance moves from the video game, FORTNITE by Epic Games. Councillor Kwesi DesVignes stated, besides the dance moves, what was interesting about the Fortnite game was the option to choose pristine open world environments and he compared to Tobago, in that we have the power to preserve our most pristine and sensitive environments.

The Symposium encouraged students to rethink their actions and likely impacts on the environment and to stimulate activities that can assist them in becoming stewards of our natural resources. Our marine environment continues to be very important as oceans cover about 70% of the earth and support an incredible variety of life.



Top Left:
Christopher Alexis, Research Officer, Geology - IMA

Top Right:
Participants partaking in delicious fish broth

The oceans are a significant source of oxygen for our planet and are instrumental in the capture and storage of carbon dioxide. An increase of carbon dioxide can lead to ocean acidification. Ocean acidification is the decrease in the pH (scale of acidity and alkalinity) and increase in acidity of the earth's oceans.

Marine species provide important ecosystem services such as the provision of food, medicines, and livelihoods. They also support tourism and recreational activities around the world.

Unfortunately, the resources of the sea have been over-harvested by humans, threatening marine biodiversity. The consequences of over-fishing and habitat destruction are evident in many parts of the world and may have already damaged the marine ecosystem irreversibly. Now that the effects of over-fishing, ocean acidification and climate change are better understood by scientist worldwide it is critical that marine species are protected to secure their survival and maintain the ecosystem services they provide. The IMA continues to provide information to inform policy on marine and environmental matters. The Fish Broth and Talk and the School Symposium marked the finale of a series of activities to commemorate the IMA's 40th anniversary for 2018.

Cover photo:
Councillor Kwesi DesVignes being schooled in a popular dance by a student

Above:
Neila Bobb-Prescott, Chief Technical Advisor Improving Forest and Protected Area Management in Trinidad and Tobago Food and Agriculture Organization of the United Nations (FAO) listens attentively to contributions made by participant

Managerial appointments

Lieutenant (Lt.) Sonny Jitta

Lieutenant (Lt.) Sonny Jitta joined the IMA on 1st October 2018 after serving as the Project Manager at the North Central Regional Health Authority. Prior to this appointment, Lt. Jitta held positions as Project Manager, Senior Project Manager and Senior Facilities Manager at the Project Management Unit of the Ministry of Health, Ministry of Community Development, Culture and the Arts, Metal Industries Company Limited and NH International (Caribbean) Ltd.

Lt. Jitta holds an Executive Master of Business Administration (EMBA) from the Arthur Lok Jack Global School of Business, Higher National Certificate in Civil Engineering from the University of London Edexel Foundation, Diploma in Project Management from Cipriani College of Labour and Cooperative Studies and has Project Management Professional Certification from the Project Management Institute (PMI) in Pensylvania.

As the pre-fix to his name denotes, Lt. Jitta has a history with the Trinidad and Tobago Defence Force, which has not ended as he is an active reserve within the Force. He has a decorated career within the Force as he was awarded the Military Gold Medal for the Summit of Americas and letter of commendation from the Commanding Officer of the Trinidad and Tobago Defence Force Reserves.

Our new Operations Manager hopes to engender a team spirit within the IMA and develop and mentor team members in their chosen profession and personal development. This will redound to the benefit of the organisation and by extension the people of Trinidad and Tobago. His vision for the IMA is to strengthen its processes and systems in keeping with senior management goals intent and his remit.

Lt. Jitta succeeds Mr. Zaheer Khan who has been ad interim Operations Manager since May 2015.
The Board wishes to record its appreciation to Mr. Zaheer Khan for his contributions during the last three-years in maintaining the Operations Department.

Mr. Glen Stephen

Mr. Glen Stephen assumed the position of Finance and Administration Manager on 5th November 2018. Mr. Stephen succeeds Mrs. Rhonda Joseph who was overseeing the operations of the Finance and Administration Department since May 2018.

Mr. Stephen is a results driven Finance and Project Management Professional with approximately two decades of leadership experience in accounting and finance. Mr. Stephen's skill sets include experience in investment appraisal, cash forecasting, budgeting, financial statement analysis, internal control assessment and tax planning.

Mr. Stephen will join the IMA after serving as the Chief Financial Officer at the National Quarries Company Limited. Prior to this appointment, Mr. Stephen held positions as Head of Finance, Accountant – Financial Operations and Senior Accountant at Government Information Services Limited, The Urban Development Corporation of Trinidad and Tobago and Ferreira Optical Limited.

Mr. Stephen is a Fellow of the Chartered Association of Certified Accountants, a Member of the Institute of Chartered Accountants of Trinidad and Tobago, a Member of the Project Management Institute (USA) and a holder of a Master of Business Administration awarded by Anglia Ruskin University.

The Board wishes to record its appreciation to Mrs. Rhonda Joseph for her contributions during the last few months in maintaining the Finance and Administration Department.

Representatives of CARICOM
Photo: Dr. Farahnaz Solomon

Blue Economy

Farahnaz Solomon PhD, Reesearch Officer,
Institute of Marine Affairs

Over 18, 000 participants from 184 countries attended the Sustainable Blue Economy Conference, in Nairobi, Kenya from the 26th – 28th November 2018. Present were Heads of State, Ministers and representatives from a wide range of sectors including business and private sector entities, academia, science and research, international and intergovernmental organisations and non-governmental and civil society organisations. Conference activities included a leader's commitment segment, signature thematic sessions, a science and research symposium and civil society, youth, business and private sector forums. Led by Her Excellency Pennelope Beckles Trinidad and Tobago's permanent representative to the United Nations, Trinidad and Tobago's delegation comprised individuals from government (including the Tobago House of Assembly), civil society and youth.

The Blue Economy is defined as 'the sustainable use of ocean resources for economic growth, improved livelihoods and jobs, while preserving the health of the marine and coastal environment' (World Bank, 2016). It has its origins in the "green economy" concept endorsed at the United Nations Conference on Sustainable Development in 2012. It developed from the realization that many coastal and island states have jurisdiction over sea areas that are much larger than their land area – hence their future resource base is mainly marine and not terrestrial.

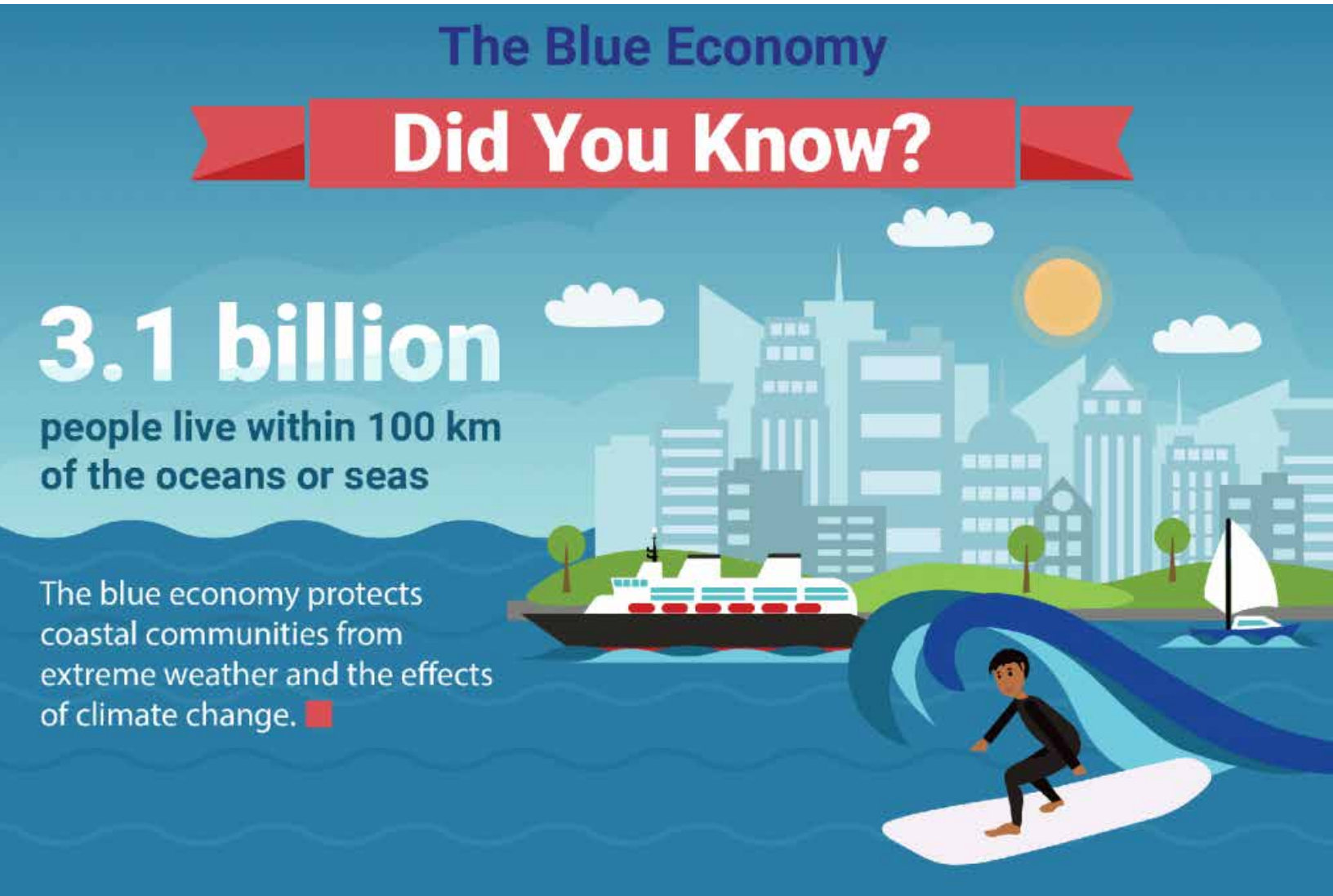
The idea of using the sea for economic gain is not a novel idea. Many activities that make up the blue economy, such as fisheries, coastal tourism and maritime transport have been part of human economic activities for centuries. Indeed, many Caribbean islands are already exploiting their ocean resources. Locally, Trinidad and Tobago with 15 times more sea than land, has traditionally depended on its coastal and ocean resources for economic prosperity, primarily from petroleum exploration, tourism and fisheries. In 2015, it was estimated that the contribution of coastal activity to the Trinidad and Tobago's Gross Domestic Product amounted to as much as US 2.14 billion dollars.

The Blue Economy however, is not just simply about exploiting our ocean resources for economic gains. In the "business-as-usual model", countries develop their ocean economies through the exploitation of their

maritime and marine resources – often without regard to the effect of their activities on the future health or productivity of those same resources. The Blue Economy model views these resources as natural capital assets which must be maintained or expanded to ensure the sustainable flow of benefits. Similar to the green economy, key to the Blue Economy is the improvement of human wellbeing and social equity, while reducing environmental risks and ecological scarcities (environment degradation and the loss of ecosystem goods and services). Realizing the full potential of the Blue Economy means inclusion and participation of all affected social groups and sectors.

In recent years, the Blue Economy framework has been increasingly embraced by many countries. Small Island Developing States (SIDS) in particular have championed the Blue Economy. In the Caribbean, worthy of mention is neighboring Grenada - one of the world's first countries to develop a "Blue growth vision". With over 70 times more ocean space than land area, its national "masterplan" for blue growth identifies opportunities for development in the areas of fisheries and aquaculture, blue biotechnology, renewable energy and research and innovation. Key components of its plan includes, the establishment of marine protected areas, coral reef and mangrove rehabilitation, alternative livelihoods strategies and an insurance program to protect small-scale fishing businesses against the increasing impacts of climate change. At the national level, a number of other countries have introduced policies to support the transition. A major step for Trinidad and Tobago is the development of an integrated coastal zone management policy (ICZM) framework which aims for the coordinated management of its coastal zone – moving away from a sectoral approach.

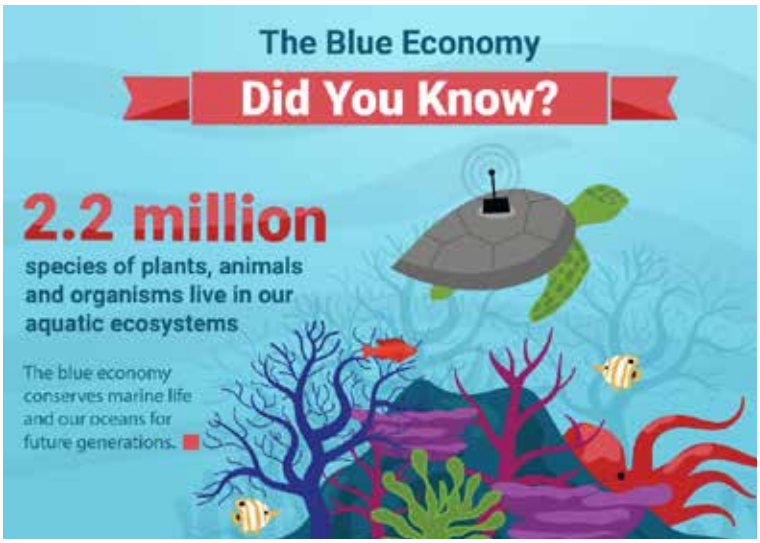
Regionally, the Caribbean Sea is a crucial resource shared by some 37 countries and territories. Whilst the fragmented nature of ocean governance in Caribbean can be a challenge in developing the Blue Economy, given the transboundary nature and connectivity of blue economy activities and resources, development of a regional "Blue Economy" framework is imperative.



There has been some sub-regional/regional initiatives that can contribute in this regard. The Caribbean Large Marine Ecosystem (CLME) Project and the Eastern Caribbean Regional Oceans Policy and Action Plan - a policy framework for the Blue Economy in the Eastern Caribbean, are just two such initiatives. More needs to be done however, collectively and with greater focus and intensity.

Developing the Blue Economy would not be easy sailing for any Caribbean island. There are many challenges intrinsic to small islands – small population size, increased vulnerability to climate change impacts and natural disaster and resources limitations in terms, skills, technology and finances. Added to this, many of our coastal resources and ecosystems are already degraded to the extent that their benefits to future generations have been reduced. Overfishing, coastal development and pollution threatens the natural capital of our blue economy.

The 2030 Agenda for Sustainable Development which was adopted globally in 2015 supports the Blue Economy approach through several of its Sustainable Development Goals (SDGs). Goal 14 – Life Below Water is particularly explicit setting targets to reduce marine pollution, protect coastal and marine ecosystems, end over- fishing and illegal, unreported, unregulated (IUU) fishing and increase the benefits to SIDS from the sustainable use of their marine resources.



Her Excellency Pennelope Beckles giving a presentation at Sustainable Blue Economy Conference 2018

Further actions that can help the Caribbean advance towards the blue economy include, formal recognition of the blue economy as an economic driver, and inclusion in the national accounting system; the creation of an enabling environment in the form of appropriate policies, legislation, incentives, infrastructure and finances and increase education and awareness about the blue economy. For Small Island states with considerable ocean resources at their disposal, maximizing economic growth in the blue economy can assist in achieving broad policy goals such as poverty reduction, food security, climate change mitigation, ocean conservation and energy security.

Commitments from governments and organisations at the Sustainable Blue Economy Conference were quite varied and included (1) the designation of marine protected areas for biodiversity protection (2) the implementation of measures to address plastic and waste management for example, the banning of single-use plastics (3) increased maritime safety and security (4) reducing IUU fishing (4) developing the mariculture industry and (5) financing to support Blue Economy growth and development. The Caribbean and Trinidad and Tobago must capitalize on this global momentum and take advantage of potential opportunities for collaborations, training, financing etc. in advancing the development of their Blue Economy.

How organisms are named!

Attish Kanhai, Research Officer,
Institute of Marine Affairs

Road Runner and Wile E. Coyote, created by Chuck Jones and Michael Maltese

Growing up as a child in the 80s the Looney toons were inescapable. Many 80s children look back fondly on the adventures of Bugs Bunny, Daffy Duck and of course the enigmatic Elmer Fudd. The two characters from this raucous bunch that would always stand out to me were Wile E. Coyote and the Road Runner. Apart from wondering how Wile E could afford to buy equipment from ACME yet still needed to hunt for dinner, I was always intrigued by the names that would appear under the names of Messrs Coyote and Runner in brackets. It would always be something ridiculous such as Accelleratii Incredibus in the case of the Road Runner or Carnivorous Vulgaris in the case of the Coyote.

I knew they were always meant to mimic scientific names in a humorous fashion but that got me thinking, many years later as someone who deals with scientific names on a regular basis, as to where these names originated and why do they take the form we are accustomed to today? No the names didn't start with Warner Brothers back in the 1930s, it goes much further back than that.

The journey goes back to 1735 and to a Swedish botanist known as Carolus Linnaeus (later known as "Carl von Linné", after his ennoblement in 1761). Born on 23 May 1707, he was the first son of Nicolaus (Nils) Ingemarsson and Christina Brodersonia (more on why these names are important later). Despite being born in a Swedish household, Latin was commonly spoken by his family, so much so that Linnaeus learned Latin before Swedish. Linnaeus's father was an amateur botanist which meant that from a young age, Linnaeus developed a love for botany due to his father. Linnaeus spent many of his childhood days out in the family's garden. It was here that his love for botany developed so much that flowers were known to calm him in moments of distress.

Apart from botany, there was something else unique about Linnaeus' father. He was the first in his ancestry to adopt a permanent surname. Before that, ancestors had used the patronymic naming system of Scandinavian countries: his father was named Ingemarsson after his father Ingemar Bengtsson. When Nils was admitted to the University of Lund, he had to take on a family name. He adopted the Latinate name Linnæus after a giant linden tree (or lime tree), *lind* in Swedish, that grew on the family homestead.

Avid football fans would have interacted with patronymic surnames quite a bit. For instance those who watched this year's world cup and wondered why all the Icelandic last names ended in *son* or why all the Croation last names ended in ic, this is the legacy of the patronymic naming system. These suffixes are meant to denote the father's first name, as the first part of the surname and the suffix *son* or ic which means "son of" (*dotter* or *dottir* means "daughter of" and is reflected in the names of females) for the rest of their last name. In this traditional nomenclature, Linnaeus' name would then have been Carl Nilson.

While Linnaeus' love of botany persisted throughout his early schooling it was only noticed in his final year of lower school by the school's headmaster who allowed him to take care of his garden. The headmaster also introduced him to the state doctor, Johan Rothman, also a botanist. Rothman would go on to have a significant influence on Linnaeus' education. In 1728, on the advice of Rothman, Linnaeus decided to attend Uppsala University where Linnaeus had access to one of the widest botanical libraries in Sweden.

It was not until 1735, when pursuing his doctoral degree in the Netherlands would Linnaeus make his first mark on the world. (Fun fact, it took Linnaeus just two weeks to complete his oral and practical examinations and be awarded a doctoral degree from the University of Harderwijk). This was the year the first edition of *Systema Naturae* was published. In it Linnaeus outlines a methodology of classification for the natural world based on dividing it into several different kingdoms: the animal kingdom *(regnum animale)*, the plant kingdom *(regnum vegetabile)*, and the "mineral kingdom" *(regnum lapideum)*. The custom at that time was for all scientific literature to be published in Latin hence the reason all species names even up to today are still latinised.

It is hard to separate Linnaeus' work at that time from his faith as he believed the order of the natural world was a reflection of the logic of God's creation. Linnaeus would write quite often about witnessing God's grand design in nature. Linnaeus was often quoted as saying *Deus creavit*, *Linnaeus disposuit*, Latin for "God created, Linnaeus organised."

After the publication of *Systema Naturae* Linnaeus' popularity began to grow and new specimens from around the world were sent to him which meant newer and ever-expanding editions of his work. The first edition of *Systema Naturae* was only 11 pages in length but by its 12th edition it had grown to 2,400 pages in 1766-1768.

While Systema Naturae made Linnaeus popular, it was his 1753 publication *Species Plantarum* (Latin for "*the Species of Plants*") that would cement his legacy for nomenclature and normalise the binomial naming system we have come to know and love. The system was not, in fact, developed by Linnaeus himself but by another scientist Gaspard Bauhin 100 years earlier in his own book *Pinax theatri botanici* (English, *Illustrated exposition of plants*).

Prior to the adoption of the modern binomial system of naming species, scientific names were quite complicated affairs (although some might argue that today's naming system is just as complicated). Polynomial names consisted of a generic name combined with a specific name that could be up to several words long. Together they formed a system of polynomial nomenclature. These names had two separate functions. First, to designate or label the species, and second, to be a diagnosis or description; however these two goals were eventually found to be incompatible. The Bauhins, Johann and Gaspard, in particular Gaspard, (1560–1624), took some important steps towards the binomial system, by tackling the unenviable task of trimming the Latin descriptions, to two words.

Each word in the binomial nomenclature has its own purpose. The first part of the name identifies the genus to which the species belongs; the second part – the **specific name** or **specific epithet** – identifies the species within the genus. For example, humans belong to the genus *Homo* and within this genus to the species *Homo sapiens*. There is a common sense reasoning behind the naming of organisms for examples, human beings *Homo sapiens* translates to " wise man" whereas , *Homo troglodytes* ("cave-dwelling man"), referred to the chimpanzee, now known as *Pan trogolodytes*. Probably the most widely known binomial is *Tyrannosaurus rex* due in no small part to its popularity in movies.

All of this may seem unnecessarily complicated. Indeed only a small subset of the human population will interact with binomial scientific names on a regular basis. This lends itself to the question, why go through all of this trouble? Why is such a structured and complicated naming system important at all? The use of scientific names standardises what an organism is called throughout every part of the world. Local names may vary from place to place but a scientific name ensures there is no confusion about a specific organism when being studied. It ensures proper communication between scientists in different countries, which is often necessary. Linnaeus also gives a deeper meaning of the need for scientific nomenclature, "If the names are unknown knowledge of the things also perishes..." Naming is also way of preserving knowledge of all we have learned over the millennia. Without names we would all pretty much be lost.

IMA Events & Activities

The Future of Environmentally Sensitive areas

The Environmental Management Authority (EMA) hosted a ceremony to officially welcome and recognise the members who will represent the Management Advisory Committees (MACs) for the Matura National Park and the Nariva Swamp Environmentally Sensitive Areas on Thursday 15th November 2018 at the EMA's North Office location in Port-of-Spain. Glendon Glasgow, Information Officer (IMA) has been nominated as the representative to serve on the Matura National Park Environmentally Sensitive Area. The Government of the Republic of Trinidad and Tobago (GORTT) initiated policy reforms aimed at preventing biodiversity loss and improving the management protected areas (PAs), with the adoption of new PA and Forest policies in 2011 and a new National Wildlife Policy in 2013. In line with these activities the Government subsequently requested financial support from the Global Environment Facility (GEF) through the Food and Agriculture Organization of the United Nations (FAO) to design and implement this four year project. The project features a participatory approach to arrive at recommendations for management plans at six pilot sites, one of the sites being the Matura Forest and coastal zone. Management Advisory members provide oversight and technical support for the management of the Environmentally Sensitive Areas.

Glendon Glasgow, Information Officer, IMA with Mr. Gordon Paul, Director, EMA

A day in the Life of a Benthic Ecologist

Meet Attish the IMA's Benthic Ecologist, looking for tiny organisms through a microscope. You may be thinking what is benthic ecology and why look for tiny creatures. Benthic ecology is a large and very diverse field that explores how organisms that live on the ocean floor interact with and influence the biotic and abiotic environment. Abiotic factors refer to non-living factors such as water and air while biotic refers to are living things. For example, plants, animals, fungi. Living organisms found in sediment samples can indicate the health of an ecosystem, so a pink dye is used to stain only organisms that were once living, making it easier to see under the microscope. In March and September 2018, the IMA conducted benthic sampling in the Bon Accord Lagoon. This sample of the ocean floor was taken among the plentiful seagrass beds with the aim of counting and assessing the existing macro fauna (invertebrates that live on or in sediment). Bon Accord Lagoon is one of the few areas of extensive seagrass growth on both of the nation's islands. Seagrass beds in Trinidad have all but disappeared. This study aims at comparing a previous study conducted in 2007 where the macrobenthic community in seagrass beds of both Trinidad and Tobago were quantified and assessed. Seagrass beds provide habitat, shelter and food for many invertebrates. Globally seagrass beds have been disappearing at a rate of 110km2yr-1. Seagrass beds are highly susceptible to deteriorating water quality and increased sedimentation. Studies around various parts of the world has shown a decrease in species richness and diversity in the absence seagrass beds.

Research Officer, Attish Kanhai (Benthic Ecology)

IMA at UTT Career Orientation

The IMA participated in the Career Orientation series at The University of Trinidad & Tobago Chaguaramas Campus on 23rd November 2018 where post graduates students got an intricate look into possible career paths in the field of marine sciences. Many students expressed interest in coral reef research as they lamented on the importance of its conservation. An estimated 60 students visited the IMA's booth.

Ancient Secrets of IMA

Alana Jute, Research Officer, Taxonomy - IMA

The Institute of Marine Affairs has a well-kept secret, which is that it houses the largest marine natural history collection for Trinidad and Tobago. This collection which is approximately 38 years old has species that were collected as far back as the 1960's. The collection showcases the diversity of Trinidad and Tobago's marine environment – there are shallow and deepsea fish, sharks, crabs, lobsters, shrimp, sponges, starfish, sea cumbers, gastropods (seashells) and coral. It is possible that some of these specimens may no longer exist in the natural environment today because of impacts on the marine environment from coastal development, this makes the collection very valuable not just to marine scientists but also to the general public. It is important that we know what exists in our waters because all life is connected and when we lose one organism it can disrupt the balance within the ecosystems, which will directly affect us. For example the marine invasive lionfish feeding on commercially important fish. Trinidad and Tobago like the rest of the Caribbean is a Small Island State which depends directly and indirectly on the resources of the ocean. We also have much more ocean than land to manage yet there is so much about our waters that we don't know, therefore further exploration is needed. In Trinidad we may not depend heavily on the resources of the ocean for our main revenue but it does provide important goods and services such as food, recreation and livelihoods for many locals and visiting tourist. IMA's marine collection helps to educate the public about our amazing marine biodiversity and it aids marine scientists to better understand that connectivity that exists between all life within the ocean.

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THE BLUE CORNER

Christmas Tree Worm

The Christmas Tree Worm, you will not find this worm feeding on your new year's pigeon peas. The common name for these worms is derived from their appearance, not their habitat or diet.

These worms don't move around much and the Christmas tree-like crowns are composed of radioles, or hair-like appendages radiating from the worm's central spine. The appendages are used for respiration and to catch dinner, which typically consists of microscopic plants, or phyto-plankton, floating in the water.

Photo credit: Jahson Alemu I

References https://oceanservice.noaa.gov/facts/xmas-tree.html

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