

Is a Visayan term for the rising of the tide. Every flood of the tide brings with it new nutrients and other important components that sustain the numerous denizens in the intertidal zone. Just as these nutrients nourish marine life, the nutrients that are being brought in, information is also vital for marine scientists.

This newsletter aims to update the XU community and our partners on the different programs and activities of the MMC.

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PAGTÁOB

THE OFFICIAL NEWSLETTER OF THE MCKEOUGH MARINE CENTER XAVIER UNIVERSITY



FINALLY, A DREAM COME TRUE – XU MARINE STATION!

by Ria Duana A Roble and Fr Mars P Tan, SJ

The plan to have a marine station goes back to the last few years of Fr. McKeough, SJ. Several site proposals were tried but each one had a problem. Finally, in 2011, the University bought the resort lot in Solana with some structures already existing. The McKeough Marine Center (MMC) with the assistance of the Office of the Assistant to the President for Campus Development (APCD) and some key resource persons in the University made all the preparations and planning for the approval of the final station construction proposal by the University president.

Chairperson Elaine Villaluz, Architect Ernest Martin Soriano, Hammerman Construction Manager Mr. Gil Macarat, Engr. Noemi Dacudao and Mr. Ramil Pajo of the Physical Plant Office in Solana, Barangay Officials, XU RSO, MMC, Communications Office staff and other guest.

Fr. Bobby in his speech gave three reasons why he is fully supportive of the future University marine station: (1) to give due recognition to the pioneering work of Fr. James McKeough, SJ, who started marine studies in Mindanao; (2) to actualize the University's commitment to care for the environment; and (3) to reinvigorate further the research capabilities of the University.

MMC held a groundbreaking ceremony last June 8 for the construction of Xavier University Marine Station in Brgy. Solana, Jasaan, Misamis Oriental. Among those present during the ceremony were XU President Fr. Roberto Yap, SJ, Vice President for Research and Social Outreach Dr. Hilly Quiaoit, Vice President for Administration Bro. Noel Cantago, SJ, MMC Director Fr. Mars Tan, SJ, Biology

The XU marine station will be equipped with outdoor and indoor tanks of flowing sea or freshwater; a wet and a dry indoor laboratories; a controlled room for experiments and microculture; a pump and aeration system; a fully equipped diving unit (including compressor); offices; and a space for Information and

Education Campaign (IEC) activities. Adjacent to the future marine station is the existing activity center composed of a multi-purpose hall, a 2-storey house, and several cottages for trainings, capacity building activities of the MMC and other stakeholders. MMC also plans to develop the bay and coastal areas of the marine station into field sites for future on-site experiments/projects of the University.

At present, a weekly coordination meeting, every Wednesday afternoon, with Bro. Noel Cantago, SJ, Engr. Noemi Dacudao, Mr. Ramil Pajo, Architect Ernest Martin Soriano, Engr. Gil Macarat and Mr. Friday Atilano is being held to address concerns, supervise the contractors and evaluate the details and progress of the ongoing construction. The construction is expected to be finished on November 2013.

The XU marine station aims to support researches requiring land and ocean-based set-ups, field/laboratory experiments for Biology and Marine Biology courses and facility for marine science research dedicated to the sustainable development of the coastal community and environment. ✨

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1

XU Marine Station: A Home to Sea Turtles

by Czarmayne T. Escoro

For the third time, since the property was acquired in 2011, a sea turtle nested in the Marine Station at Solana, Jasaan, Misamis Oriental. Sea turtles are marine reptiles that have existed since the time of the dinosaurs but are currently endangered because of illegal poaching of adults and collection of eggs. They are protected by international and local laws.

A unique characteristic of sea turtles is that they are always known to go back to lay eggs in the beach (natal beach) where they were hatched. A single clutch can contain from 100-200 eggs and takes approximately 60 days to hatch. The property according to the locals is a nesting site of sea turtle.

In Macajalar and Gingoog bays, the Marine station in Jasaan along with the municipalities of Alubijid, El Salvador, Opol, Cagayan de Oro, Jasaan, Salay, Sugbongcogon, Medina, and Magsaysay are known to have nesting sites of the critically endangered Hawksbill turtle. The first was on May 16, 2012 that hatched on August 2 with 80 hatchlings. The second was on May 15 this year that hatched last July 14 with approximately 159 hatchlings. And recently, the third nesting was just July 7 and expected to hatch on September. Four out of the seven sea turtle species worldwide are observed in 22 barangays along Macajalar and Gingoog bays. Hawksbill and Green turtle have the highest

occurrences, while the Olive Ridley and the largest sea turtle, Leatherback, have casual and accidental occurrences (Quimpo, 2013). Majority of reported sea turtle interactions were due to bycatch as they get trapped in fishermen's nets and gears. There are incidences where hatchlings are being kept as pet and nesting female getting stranded on land.

With sea turtles being endangered plus increasing reports on sea turtle nesting, hatching, and foraging, an increase in public awareness, community participation, research and monitoring activities are highly urged. ✨



Enrique "Nong Eking" Mandang (Marine Station care taker) building fence around the nest to protect from predators



A Hawksbill turtle (*Eretmochelys imbricata*) crawling ashore to nest

Marine Corner



Photograph by: Stuart Westmorland/Corbis

- Dolphin is a highly intelligent marine mammal found worldwide, mostly in the shallow seas of continental shelves.
- They are carnivores, mostly eating fish and crustaceans.
- They are the only mammals that give birth with the tail first instead of the head.
- They communicate through a process called echolocation. This allows them to send out sound waves that are like a click. When those sounds hit an object, it bounces back vibrations to the dolphins. They use this to find prey and hunt together.



- “Guso” despite their green to black color are Red seaweeds, mostly belonging to genus *Gracilaria*.
- Diverse and abundant along the bay, but highly seasonal.
- Major source of Agar—a solidifying agent that’s been used widely for cosmetics, pharmaceutical to food industries.



A Nursery for Special Plants in Manresa Farm

by Mary Jean B. Apuan

Finally, the construction of the nursery for Mineral Recovery Research of the MMC has been completed last July 6, 2013. XU engages in this research project in collaboration with Ateneo de Manila University, University of the Philippines-Los Baños, Caraga State University and University of Melbourne, Australia through Dr. Augustine Doronila as part of the ridge to reef initiatives of the Research and Social Outreach cluster of the University.

The nursery is now fully operational to cater to experiments being conducted by the project team on topics related to mineral recovery. It currently hosts several samples of plants from mining sites in Mindanao like in Brgy. Tumpagon in Cagayan de Oro City, Placer and Silangan in Surigao del Norte, and Manticao in Misamis Oriental.

This project aims to identify and to mass propagate local hyper-accumulator plants capable of extracting arsenic and copper metals stored in abandoned mining sites in Mindanao. Hyper-accumulator plants are plants that absorb metals in the soil and accumulate them in their shoots in extraordinarily high amount. The nursery structure is fitted with water

system, an important component needed for plant maintenance. It is also fully covered with nets to prevent entry of destructive insects. The flooring is covered with loose gravel that allows proper drainage yet maintaining cleanliness and providing a pleasant ambience in the place. Its roofing is designed for plant acclimatization that allows plant to become hardened and ready for transplantation to an open field.

Ongoing research in the nursery is on propagation of these collected plants for the development of set of protocols for their mass propagation. Other continuing studies are the spore germination of ferns and the plant responses to vegetative propagation techniques, more specifically, on separation and cuttings.

The use of the nursery is also offered to any XU-College of Agriculture faculty member or student who wants to do research study related to the propagation of hyper-accumulator plants. ✨

MMC to conduct giant clam research

by Czarmayne T. Escoro

For 7 years now, the MMC in coordination with the LGU of Jasaan and some volunteers had been monitoring the giant clams in Agutayan Island, Jasaan, Misamis Oriental. And last July 16, 2013, MMC in its 3rd regular bimonthly monitoring invited a clam biologist in view of a future research study on the declining clam population. Originally, a total of 574 clams were reseeded in 2001, however, previous monitoring conducted revealed only 163 clams left.

Giant clams are the largest living mollusks. They are included in the list of endangered species by the Convention of International Trade in Endangered Species of Wild Fauna and Flora (CITES). Seeding and establishing a breeding population of the clams in Agutayan Island aims to help replenish the country's depleting stocks. But with the decreasing number of giant clams in Jasaan, is the goal still possible?

To make an initial intervention, monitoring activity has to include research on the possible causes of the decline. Ms. Roa is a clam biologist who previously worked at the University of the Philippines Marine Science Institute. In the pre-monitoring meeting, she shared her knowledge on the giant clam and added few procedures in the monitoring method.

The monitoring activity was conducted from 8:30AM-12:00 NN, and was participated by 6 MMC research staffs, 2 XU Biology students,

MMC goes REMoDel MacBay

by Czarmayne T. Escoro

Macajalar Bay hosts several big local industries such as the Philippine Sinter Corporation, Del Monte Philippines, Inc., Mindanao Container Port, 210 Megawatt Mindanao Coal-Fired Power Plant, and supports around 75,000 coastal population (ESCAP, 1996). As industrial activities expanded and population rapidly increased, research studies conducted in the last decade (1997-2007) indicated a decline in the health conditions of some coastal marine ecosystems (Atrigenio et al., 1998 & Aliño et al., 2002).

To establish a long term comprehensive data on the ecological conditions of Macajalar Bay, MMC research staff and Biology



True giant clam (*Tridacna gigas*) in the natural environment

and 4 volunteers. In addition to shell length and color of the mantle, the shell width and depth were also measured. Further, some physico-chemical parameters like dissolved oxygen, pH, salinity, temperature, and transparency were also collected and measured on site.

The data generated will be used as baseline information to determine whether the environmental conditions in the area are still suitable for the survival and growth of the clams. Also the result will be used as a reference on determining possible areas where some of the clams can be relocated. For now, MMC will continue its Information Education Campaign (IEC) activities and its regular on-site monitoring plus the collection of data samples for the planned research and proper intervention at the latter part of the year. ❁

Component	Project Leader	Field Assistants
Coral	Dulce Dawang	Patrice Roa
Fish	Fra-and Quimpo	Jaylan Tuba & Timothy Quimpo
Mangrove	Lolita Martinez	Tom Genovia, Majen Casinillo, Julie Acero, Paul Sildo, Daniel Linog
Seagrass	Gertrude Garcia	Joseph Garcia & Raymund Dumangcas
Seaweeds	Elaine Villaluz	Czarmayne Escoro & Jue Lalas
Macroinvertebrate	Anita Mabao	June Cabiguin & Shean Roa
Microinvertebrate	Kristine Galarrita	Jo Marie Acero



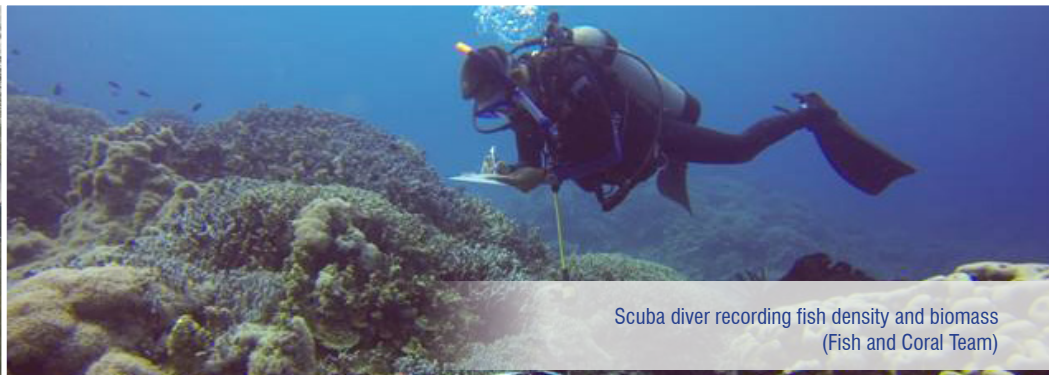
Field assistant recording seagrass cover (Seagrass Team)



Project leader and field assistant collecting macroinvertebrate specimens (Macroinvertebrate Team)



Field assistant and PCRA volunteer recording seaweed cover (Seaweeds Team)



Scuba diver recording fish density and biomass (Fish and Coral Team)



Project leader and field assistant collecting sediment samples for soft bottom fauna (Macroinvertebrate Team)



Field assistants measuring and recording the GBH for mangrove cover (Mangrove Team)

faculty researchers conducted the 3rd bay resource assessment dubbed REMoDel MacBay (Resource and Ecological Monitoring for Sustainable Development in MacBay), from April to May 2013. This was a continuation of the biannual survey conducted by MMC that began in 2008.

To determine the status of the coastal resources, assessments were made on four (4) selected permanent sites for comparison over time, namely, Kinoguitan, Jasaan, Opol and Laguindingan. Assessments were based on the following biological parameters: (i) coral cover, (ii) fish density and biomass, (iii) mangrove cover, (iv) seagrass cover, (v) seaweed cover, (vi) macroinvertebrate biodiversity and (vii) microinvertebrate biodiversity. A project leader and 1-5 research assistants took charge of each component parameter.

During sampling activities, the components were divided into two groups: 1) MISS (Mangrove, Invertebrate, Seaweeds, Seagrass); and 2) FC (Fish, Coral). MISS group did the samplings on April 25 (Kinoguitan) and 26 (Jasaan), May 7-8 (Opol) and 9-10 (Laguindingan). FC team conducted their samplings on May 6-7 (Jasaan), 9-11 (Laguindingan), 15 (Opol) and 17-18 (Kinoguitan).

The target beneficiaries of this study are the bay's fishing communities, local government units within the bay and the academic communities. After analyses, data results generated should help stakeholders understand better the bay's ecological conditions given the changes or trends observed over the years.

More accurate information and better appreciation of results will equip environmental managers and planners to upgrade coastal management plan and implement effectively an integrated Coastal Management program. Data generated can be used as reference for short term and long term planning of industries and other corporations. Further, data can be used as basis for academic researches and for appropriate interventions aimed at addressing future problems in the bay.

This will provide the scientific data needed for a science-based information and education campaign to increase awareness on the plight of the natural resources of the bay. ✨

Reference: E. Villaluz et al. Resource and Ecological Monitoring for Sustainable Development in MacBay (ReMoDel MacBay) Mindanao Research Proposal



MMC RECOLLECTION: ENRICHING SOUL AND EMPOWERING SELF WITH GOD'S LOVE

by Ria Duana A. Roble

July 6th was a remarkable day because the McKeough Marine Center (MMC) held for the first time a recollection at the Manresa Tagbuan Center, Cagayan de Oro City. It was a spiritual deepening activity to start the school year right.

To grow in awareness of God's love and be filled with gratitude were the bits of learning on the first growth session: My Gift of Self. A children's story of the House for Hermit Crab touched everybody's hearts. The crab looked for a big house to move into. As it traveled, the crab met sea creatures (corals, sea anemone, sea star, and snail) that it wanted to add to its plain shell making it a place that feels like home. Since the hermit crab continues to grow, it leaves its home and friends making room for another smaller crab to stay. In life, people come and go, leaving footprints in one's thoughts. Experiences help people to become wiser and better. It reminded everyone that nothing lasts forever and it's a call to make the best out of every blessing that comes in. Understanding oneself is the key to be in good relationship with different kinds of people and always accept the reality combined with courage.

To be more adept to the word of God in the Bible and to adore the unique invitation of God which has shaped up one's decisions in life were the points emphasized on the second growth session: My Life as a Gift. Individual life map drawings were made from birth up to present. Being able to reflect especially on God's grace, everybody was able to share his/her individual experiences and life's journey. God has given everyone the gift of life and it depends upon the person on how to give himself/herself the gift of living well. Each one had a story to tell and shared values upon which to contemplate.

With this, the people in MMC now had a better understanding with one another. This activity would create better teamwork for MMC in achieving its goals and projects as being the research and social development arm in the field of marine science.

A routine to wake up-eat-work-eat-sleep and the cycle goes on for the people in MMC every day. "Busy sa work" and "No time to pray" were the common lines heard. This recollection gave a perfect opportunity to talk one-on-one with God and know more of one's self. Everyone was given with an ample time to be alone and reflect about life. Silence is a way to keep the mind calm and it brings peace to help realize things everyone are still unaware of. As what Mother Teresa said "We need to find God, and He cannot be found in noise and restlessness. God is the friend of silence."

God never placed anybody into a problem without enabling him/her to handle it. There may be questions left unanswered, doubts throttling the mind, but if trust prevails in everyone's heart, there is someone out there, who never left and will never leave one's side for He has known us even before we were formed in the womb. A quote to ponder from Elisabeth Kubler-Ross: "Learn to get in touch with the silence within yourself, and know that everything in life has purpose. There are no mistakes, no coincidences, all events are blessings given to us to learn from."

MMC was thankful to Dr. Maria Elena Paulma for sharing her time and insights to facilitate the whole activity. Smiles and giggles left that day were irreplaceable. To sum it all, everyone was blessed, hoping for another spiritual-filled growth session next year. ✨



Faith and Science (according to Ignatian Spirituality)

by Fr. Mars P. Tan, SJ

Not many students would easily see and accept the compatibility between science and religion. Once I gave a lecture on the geological processes of mountain and volcanic formations, one student in the class blurted out “That’s not in the Bible, Father!” Taken aback for awhile I hurriedly answered, “No it’s there but hidden!” Immediately I realized I had to do the explaining for her to see what was kept hidden from her inquisitive mind. In fairness to my bright student, science and religion indeed are not known natural partners. Why? One reason is, we get stuck to a rigid and traditional fossilized image of God and all that He represents. Second, we are used to seeing and practicing science as a purely human enterprise devoid of any relation with the Spirit.

Any student or teacher in a Jesuit school should embrace faith and science as mutual partners for human development and the advancement of the world. One is not against the other. On the contrary, one is enhanced and sharpened by the other for mutual benefits. Science, on one hand, engages matter not apart from the rest of reality. If it does, the world is to be understood as billions of bits and pieces, scattered and pointless in directions. Life is only made up of events that are merely accident players in natural processes and ultimately and inevitably hits a “missing link.” Faith, on the other hand, is not just about sets of human responses to a God restricted within pre-set externalities and absolutism. If it is, faith becomes devoid of life, unable to connect to realities and to enliven matter. It bounds to become like a piece of matter, isolated and dead.

The Society of Jesus has a strong science tradition in their schools and other ministries since its Pre-Suppression Period (17th century). Science has always played an important role both in Jesuits schools and in the individual engagements of Jesuits in researches and discoveries. To date, 35 moon craters are named after Jesuit scientists. Close to home, one asteroid has been named after a living Filipino Jesuit, Fr. Vic Badillo of the Manila Observatory. A circular instrument called Secchi disk used to measure water clarity was invented by Jesuit Pietro Angelo Secchi. Fr. Federico Faura designed the aneroid barometer, an accurate weather gauge to warn against typhoons that became a household name in the Philippines. Seventeenth century Jesuits in China manned the Imperial Observatory in Beijing while doing missionary work among Chinese officials in the Forbidden City. The past 4 centuries saw a host of Jesuit meteorologists, astronomers, botanists, physicists and mathematicians occupying the long list of Jesuit scientists known for their contribution to science. In the present century, Jesuits still keep a few observatories all over the world, foremost is the Vatican Observatory in Rome. However, some Jesuit scientists have moved to other new fields such as computer science, molecular biology, and medicine. A quite notable Jesuit in recent years is Pierre Teilhard de Chardin, a paleontologist and a mystic, who used the language of poets and mystics to describe his cosmic vision.

What has made Jesuits keep a strong interest in science and scientific investigation? One best answer is the Ignatian spirituality which each Jesuit truly imbibes in his life and tries to pass on to others. Ignatian spirituality has 3 essential characteristics (at least) to answer the questions:

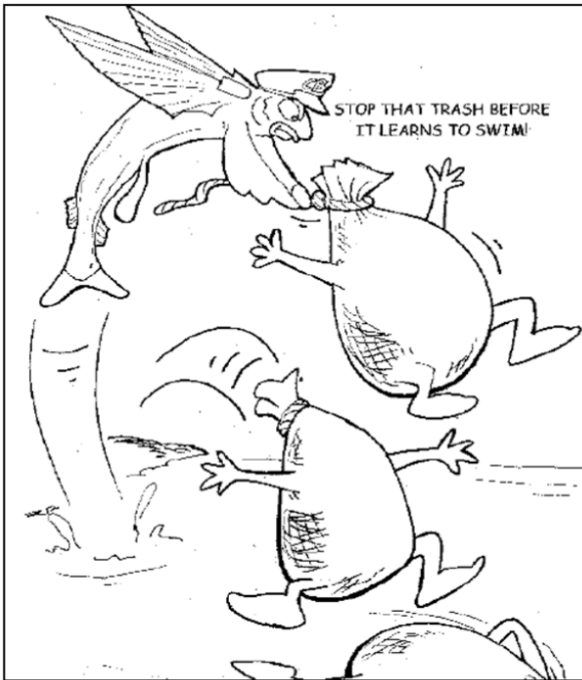
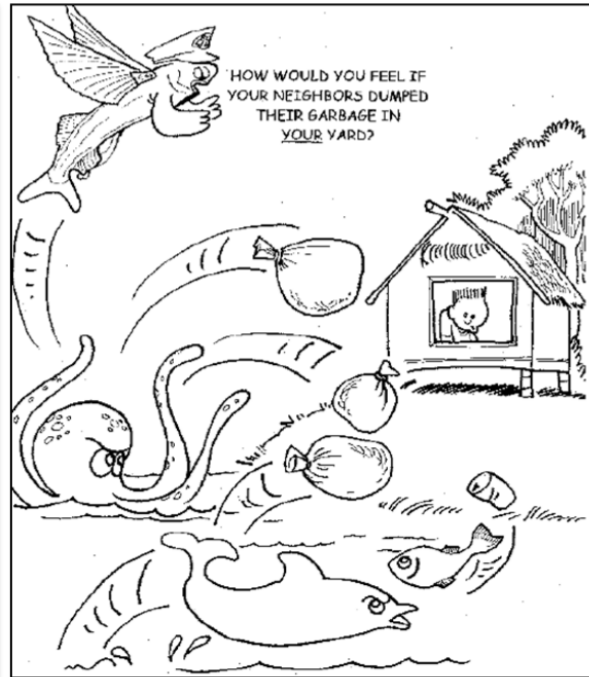
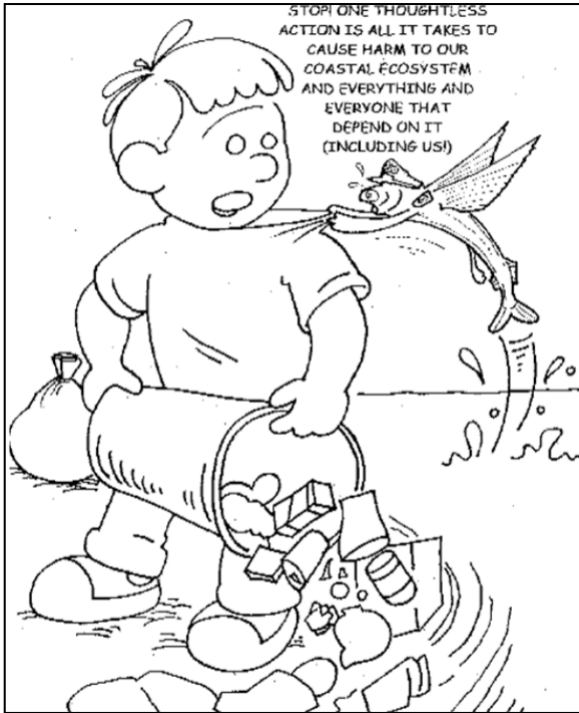
1) **Finding God in all things** – God is present in His creation, anywhere it is. Moreover, God continues to labor in His creation. Creation is an on-going process and not an event that occurred once. The world is being created as can be observed in how natural processes have continuously disrupted, changed and shaped the world through time. The work of creation is being shared by God to us now so that we become His co-creators. As with other kind of work, science gives us vast opportunities to engage in the exciting work of co-creation – observations, studies, exploration, discoveries and inventions. Every science study is a response to a constant invitation to find God in all persons and things. Every science discovery and invention is finding the newness and freshness of God deep down the core of nature and natural occurrences.

2) **Positive view of the world** – Despite and in spite of all the sufferings and sinfulness in this world, Ignatian spirituality maintains and asserts that there is hope the world offers to us. Christian hope does not necessarily presuppose human dependence on capabilities and resources. Instead, it is hope personally felt and experienced by anyone from within where God resides. Likewise, Ignatian spirituality sees the world charged with God’s grandeur and creatively unfolding its beauty and truth through time. A world affirmed as good necessitates even a glimmer of this hope to keep the work of science going undaunted by cynicism and irrationality. For science, hope is never easy and convenient. It affirms a path to discovery and newness of things as quite difficult but still possible to find. Indeed it is, for human work of science is drawn naturally to the natural course of things around because the same God actively works within both (human person and the world) in their never ending process of becoming.

3) **Magis** – Not primarily a quantitative measure of one’s accomplishments and talents. Rather, it is a measure of the magnanimity of one’s heart to respond to God’s constant invitation to love and to serve. It is foremost a heart magnanimous in its generosity to show love in word and in deeds. Anyone who engages science (as in many other endeavors) must have a big heart to pursue the truth it constantly seeks, and the truth it wants to serve. Science work can be long and tedious, lonely and uncertain, and seemingly a failure (sometimes) in the eyes of many. But the love for truth keeps the passion burning to continue focused on the work itself and on the God it desires to serve. Definitely, it is love, more than any other factor, that keeps science truly engaging and serving.

Imbued with Ignatian spirituality, one engages science motivated by love, drawn to a world constantly unfolding with the newness and freshness of God certainly to be found in every person and in every creation. ✨

KAPITAN BARONGOY: WINGED GUARDIAN OF THE SEA



Source: The Coastal Resource Management Project. Our seas, our life. http://oneocean.org/download/db_files/exhibit_guidebook.pdf

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