ICW Book Forum on Science Fiction

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IN THE SHORT story, "The Bookmaking Habits of Select Species," SF writer Ken Liu makes a bold declaration in his imaginative exploration of alien life: "Everyone makes books" (1). His vivid and strange descriptions of various species and their literary appetites have made for both strange and sublime reading experiences. However, his description of the alien species, the Tull-Toks, are perhaps useful to us during this discussion. In the story, he says:

> The Tull-Toks claim that everything in the universe can be read. Each star is a living text, where the massive convection currents of superheated gas tell an epic drama, with the starspots serving as punctuation, the coronal loops extended figures of speech, and the flares emphatic passages that ring true in the deep silence of cold space. Each planet contains a poem, written out in bleak, jagged, staccato rhythm of bare rocky cores or the lyrical, lingering, rich

> rhymes—both masculine and feminine—of swirling gas giants. And then there are the planets with life, constructed like intricate jeweled clockwork, containing a multitude of self-referential literary devices that echo and re-echo without end. (6)

Here, we can see that even in the imagining of alien lifeforms, there is the poetic intersections between the world around us and the language we use to describe the world around us, and the possibilities inherent in these intersections. These are the worlds in which science fiction, I believe, explores and brings forth, birthing new futures with every word.

In the field of science fiction studies, there is an emphasis on the potential of the science fiction genre to affect change, that there exists "science fiction's commitment to visions of human transformation and credits it with an inherent—though frequently fragile, ambivalent and compromised—potential for political radicalism" (Parrinder, 2) because it is through "imagining strange worlds we come to see our own conditions of life in a new and potentially revolutionary perspective" (Parrinder, 4).

In Darko Suvin's seminal 1972 essay, "On the Poetics of the Science Fiction Genre," he attempts to codify the fictional impulse to explore new worlds and extend new technologies and scientific understanding and research, and how the marriage of both fact and fictionality had birthed this literary genre. He argues for the understanding of science fiction as the "literature of cognitive estrangement" (372) and that "SF takes off from a fictional ('literary') hypothesis and develops it with extrapolating and totalizing ('scientific') rigor" (374) and it is the tension between what should be binary opposites that creates the narrative. He also emphasizes the importance of the *novum* or "a strange newness" (373) in science fiction, a term borrowed from German philosopher Ernst Bloch. The presence of the novum is what differentiates science fiction from other genres of fiction—the story is derived from scientific principles and concepts, but is not possible to realize materially in the real world. He emphasizes the importance of the novum in science fiction, in that "naturalistic fiction does not require scientific explanation, fantasy does not allow it, and SF both requires and allows it" (*Metamorphosis*, 65).

He also delineates between myth and science fiction, emphasizing that "[w]here the myth claims to explain once and for all the essence of phenomena, SF posits them first as problems and then explores where they lead to" (375) which is why he emphasizes that the tropes utilized in SF "concentrates on possible futures and their spatial equivalents" (379), which is echoed by Joe Hill in his introduction to the *2015 Best American Science Fiction and Fantasy*, where he delineates between fantasy and SF by saying that "fantasy explores the self, whereas science fiction asks you to leave

selfhood behind and see your life for what it is – a bright mote of dust adrift in a vast and beautiful and terrifying universe" (xx).

In the fifteen stories in *Diaspora Ad Astra: An Anthology of Science Fiction from the Philippines*, and in the ten stories in *Science Fiction: Filipino Fiction for Young Adults*, both series editors—Emil Flores and Joseph Nacino for the former, and Dean Alfar and Kenneth Yu for the latter—grapple with the question, "What is Philippine science fiction?" in light of both scientific advancement and the potential for new perspectives in Philippine society. After all, in terms of Philippine literary history, Filipino writers in English have been more adept in exploring these perspectives through the mode of realist fiction: the conditions and experiences of people from the past and the present have always been the subject of many Philippine short stories, but the future—which science fiction has always explored—was *terra incognita*.

In fact, the preface of *Diaspora Ad Astra* provides us with a sobering reality check, so to speak: as Emil Flores explains, "At an early age, Philippine reality had limited my imagination . . . that Filipino audiences would not accept local science fiction shows" (vii). This is echoed by Kenneth Yu, in his own foreword, where he speculated that perhaps, the dearth of science fiction stories in the Philippines was because of a lack of quality science education, that "Filipinos were not 'forward looking' in our tales, which is an element found in most science fiction" (x). However, most of these stories adhere to Darko Suvin's base definition of science fiction as a genre of cognitive estrangement—that we separate ourselves from what we know, and take a leap into the unknown, imagining what might happen beyond the confines of the world we live in. The leap is not predicated on faith or magic; it is predicated on a logical extension of scientific and technological principles and possibilities. To extend that even further, also our anxieties.

The twenty-five stories in these two anthologies, published in 2013 and 2016 respectively, allow us to take a leap and provide us with a glimpse into the future of the Filipino people. Many of the stories employ classic sf tropes: space exploration, the presence of alien life forms, the interactions between humanity and technology; and yet in using these sf tropes, they are able to provide the reader with a new perspective into the Filipino psyche. In Dean Alfar's "*The Malaya*," which opens *Diaspora Ad Astra*, the fragmented narrative provides an intimate and horrific view of the ill-fated crew of the space exploration vessel *The Malaya* and the cognitive regression of its inhabitants as they entered deep space. (Which is also reminiscent of the sci-fi movie, *Event Horizon* except *mas* weird *ang Event Horizon*.) In this story, and in the succeeding story, "Oplan Sanction," by Alexander Osias, I am reminded, tonally, of Jeff Vandermeer's *Annihilation*, in which a similar group of scientists succumbs to madness in a lush landscape that sought to redress a universal imbalance. In the stories from these two

anthologies, the Filipinos' relationship with space travel and exploration vaccilate from violent to hopeful: "Space Enough and Time" by Anne Lagamayo uses the concept of a cruise ship to explore what happens to the world's citizens when people no longer grow old and die; Celestine Trinidad's "Taking Gaia" uses the invisible presence of the OFW in global services and plots a coup to take over a space ship heading toward proverbially greener pastures. And in fact, what's interesting about "Taking Gaia" is inextend *n'ya yung joke na kayang mag*-take over ng world *ang mga Filipino* dahil lahat OFW. *Yung mga yaya tutulungan mga bata paano magtagalog* . . . She actually extends this.

The relationships between labor presence and practices and space exploration are also the subject of many short stories in the *SF: FFYA* anthology. In "Jeepney Blues" by Kim Sarabia, the disparity between the poverty of living on a ravaged Earth and the imagined opulence of life off-world is a clear analogy of the reality many Filipinos are experiencing now. Similarly, in Eliza Victoria's "Fortitude," the Filipino is always stuck on old Earth, looking up at the sky—at a new world that is forever out of reach, that is imagined to be beautiful and better than what one has now. In "The Ceres Girl" by Lakan Umali and "Infinite Degrees of Freedom" by Victor Ocampo, the fraught relationships between parents and children are made even more complex and complicated by their physical and emotional distance from each other.

Outer space for the Filipino imagination has always been entangled with economics and labor—even in one of the earliest Philippine SF stories, the fantastic "The Apollo Centennial" by Gregorio Brillantes, the disparity between the provincial poverty of the Philippines and the retro-futuristic depiction of the successes of the US space race has always been clear. It is easy to dismiss the utopic statement of space as the final frontier in humanity's constant exploration of the universe beyond the stars. However, it is probably easier to imagine that on the *USS Enterprise*, there are probably a lot of Filipinos onboard—always just off-frame, always just behind another panel, cleaning stuff, while your protagonists are off saving the galaxy.

Another fraught relationship in the stories in the two anthologies is the relationship between scientific advancement and body modifications, which is explored in stories such as "The Cost of Living" by Vince Torres, "Ashes' Embers" by Dannah Ruth S. Ballesteros, "Gene Rx" by Katya Oliva-Llego, and "The 13th Unit" by CP Coulter. Once again, economics and class divisions are underlying sources of tension in all stories—where does one get money to fund costly medical treatments, what happens to the human body when it is modified beyond its natural capabilities, and how do we continue living in the face of such mundane adversities?

All of the characters in the four stories begin in places of powerlessness: Dave's relationship with Bio Regain, who offers to resurrect his dead wife, is eerily similar to

many pyramid schemes that have proliferated across the Philippines; Joan's status as an illegal immigrant emphasizes her lack of control throughout the experiments done on her; Elaine's desire to become cosmetically more attractive reminds us of how Belo and her ilk have pushed all sorts of "natural" and chemical whitening agents on an unsuspecting female population; Ignacio's position as the last investigator into the mutations of people who were exposed to an unnatural radiation reflects a fear of the unknown, in a world where "there had been so many rumors, counter rumors, stories and tall tales. All unnatural. All *exploitable*. All generating fear amongst a population that felt helpless against the possibilities; who had the fear of God and a wariness of all unnatural wonders instilled in them since childhood" (53). Once again, scientific exploration walks hand in hand with an exploration of the Filipino's cultural and social fears. Which runs anathema to general science fiction history where science fiction walks hand in hand with utopia, where we dream of a better place. Yet here in both anthologies they don't dream of better places; they dream of fear. *Nakakatakot ang* scientific advancement.

Even technology and technological innovation are not exempt from these kinds of explorations; the advancements in technology are given new life in imagined worlds. In many of the science fiction stories in both collections, the concept of the Filipino family is always intertwined with the concept of technological advancement. The tension between intrinsic Filipino values of filial piety and loyalty are tested when juxtaposed with future-forward technology. In "Ina Dolor's Last Stand" by Raymond P. Reyes, the matriarch of a family decides to stay on a powered-down generational ship while her family moves forward and becomes part of new human colonies off-world. In Carljoe Javier's "The Day the Sexbomb Dancers Invaded Our Brains," the generational ship trope is once again used to provide a biting satire against Philippine society and its refusal to move forward from petty bickering and politics, its inherent suspicion of anything resembling intelligent thought.

And even in "Rizal" by Eliza Victoria, the price of success was the disruption of families like Ilyena's, whose drug-addled mother had disappeared under suspicious circumstances and government fictions, which sounds like a reality now. In both "The Romeo Robot" by Raymund P. Reyes and "Surrogate" by Daniel Carlos Tan, the line between technology and humanity becomes increasingly blurred as robots replace flesh-and-blood counterparts, providing a new way for the Filipino reader to grapple with what it means to be human and to maintain human connections in an increasingly replaceable world.

Even love and longing, the foundations upon which many of the oldest stories in the world has been built upon, is given a new lease on life with an exploration

of its relationship with advancements in science and technology. The body's desire to consume and its interactions with the technology that allows it to do so is also explored in "Robots and a Slice of Pizza" by Raydon L. Reyes, while in Nikki Alfar's "The Incipient End of the World," the last days of humanity during an alien visitation is given a humorous spin in which all stakes are removed—including that of a young girl confessing her affections to her classmates. Similarly, in Raven Guerrero's "Lucky," first love blossoms beneath the unearthly light of invading alien forces. In "Mooneater" by Kate Osias, an extraterrestrial first date beyond the protected biosphere of the planet is interrupted by the arrival of an ancient monster, while in my story "Erase," the potential of a first date is literally and figuratively erased by the protagonist, who preferred to live in the cavernous fictions of his digital world rather than grapple with the grim reality that surrounded him.

And yet, despite these complexities, it is easy to dismiss the genre of science fiction as niche, especially when one looks at the popular stereotype of the science fiction writer: Caucasian, male, and imagining worlds beyond the one he lives in while subsisting on fast food and typing his stories in his parents' basement. And yet the impact of science fiction on both cultural and scientific growth is staggering: from the first explorations of the genre in novels such as Mary Shelley's *Frankenstein*, Jules Verne's *10,000 Leagues Under the Sea* and *Around the World in Eighty Days*, and H. G. Wells's *War of the Worlds* to contemporary SF explorations such as Becky Chambers' *A Long Way to a Small, Angry Planet*, Cixin Liu's *The Three-Body Problem*, and Nnedi Okorafor's *Binti*, science fiction has always been used to explore the human condition when placed under strange and alien conditions. And when we take into account the long reach of sf film and television such as *Star Trek* and *Battlestar Galactica,* we can easily argue that human imagination and scientific innovation go hand in hand. The possibility of power is present in these interactions between fiction and fact. As Jason Erik Lundberg points out, "speculative fiction has power. Repressive governments around the world have at one time or another banned it from being read or written for the simple fact that it allows for the possibility of other realities, of better worlds" (71).

In a way, Philippine sf is no different from these stories—it attempts to show us the hopes and fears, horror and humanity of the Filipino people. In destabilizing our reality, these stories attempt to show us another one, to emphasize what has been subdued, to highlight what has been denied. While I think Philippine sf is still in its infancy, there is no denying that the desire to explore is there—and that the short story tradition may be the best form for it, for the moment—as it has been for science fiction in the United States and the United Kingdom, where the science fiction genre grew and morphed between the pages of magazines such as *Amazing*

Stories and *Astounding Science Fiction* (during the Golden and Silver age of SF) before branching out into the novel. We already have begun to explore these scientific possibilities through our fiction, though the end products are few and far between: the out-of-print *Project Pawai* by Jose E. C. Anozo was published in 1995, and hailed as the first and still only Philippine cyberpunk novel; *Project 17* by Eliza Victoria is perhaps one of the first sci-fi thrillers in the Philippines and was published in 2013. In between, the brief existence of the Future Fiction category in the Palancas, allowed SF to shine like a brilliant star before burning out of existence.

And, as always, there is still room for improvement—including better communication and exploration between the scientific and literary communities in this country, acceptance and inclusion of the genre in mainstream literary and writing institutions, and revising our attitudes and prejudices against the perceptions of insurmountable differences and separation of scientific and creative endeavors.

In the end, it is my understanding that there might exist a pervading thought that there is a binary dividing science and the arts: science and technology allows the human race to progress toward the future, while science fiction allows us to imagine that future in the first place. And yet, they are not really binary opposites. The divide between the sciences and humanities is, to my mind, an imagined one. After all, it is not surprising that word "technology" echoes the Greek word *techne*, which refers to "art" or "craft," the ability to work with one's hands, to make the abstract knowledge, *episteme*, concrete. To make, and to do. We will always try and make tangible what we can speculate. There will always be tension in interpreting the work of the mind into the work of the hands, to painstakingly build what was only previously imagined. And yet both science practitioners and science fiction writers do this—building worlds, and the possibilities of these worlds—bit by bit, idea by idea, word by word.

Thank you.

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PROF. RONALD CRUZ

BEFORE I STARTED teaching the Biology of Science Fiction elective that I made for students in Ateneo, I was first given a sort of primer on the science fiction genre by my coteacher Maria Mina, who had studied Philippine sci-fi for her Masters degree here in this school. She had told me that central to any scifi story is the novum, which Gabriela has also already mentioned. In fact, we started this year's class in biology of science fiction by discussing the article by Darko Sovin on the estrangement characteristic of the science fiction genre.

The novum is the new, the element that makes the story scifi, whether it's aliens or time travel or nanobots or something else. Being a biologist, of course, I am naturally drawn to stories with a novum of biological nature: aliens, hybrids, clones, artificial life forms, strange planetary ecologies, etc. Those are the ones I really enjoy reading about or watching, in terms of TV series and film. One of the first science fiction novels that I read, that I tremendously enjoyed, was *The Left Hand of Darkness* by Ursula Le Guin. It features a very unique type of reproductive mechanism among the people that populated that particular world. And I had come to add, well, not that novel, but a short story in the same universe by Le Guin in my reading list.

So yeah, I also feel, being a biologist, that I am most qualified to speak about the biological aspect of some the science fiction stories, so that's what I'm going to focus on. And so a lot of the stories that I'm going to mention are the ones with a heavy biological novum.

Vince Torres's "The Cost of Living" in *Diaspora Ad Astra* (hereinafter referred to as "Volume 1") is an eerie and somewhat disturbing take on resurrection or

revival of the dead—certainly a scientific possibility. There have been a lot of cases of humans just recently dead, just within a few minutes, within a few hours even, still being revived. It really depends on a lot of conditions, including temperature, including how how damage was sustained by the body. And some of these factors —cryostasis, cellular revival, etc.—are mentioned in the story. *'Yung* cryostasis is something very popular among people, like freezing the body. In fact, there are actually companies in the US that do that already. The very rich people, the ones with an insane amount of money, are the ones that have themselves frozen in those tanks, in these companies in the US. So that they can be thawed out sometime in the future when a cure for their disease is already available. Or something like that.

But right now we don't really have the technology to thaw out properly because we don't have . . . well, there's already a sort of scientific innovation called putrification with allows us to replace some blood with some other fluid that doesn't freeze easily. Because the problem with blood is if it freezes, it creates crystals that damage the blood vessels and the blood cells, etc. But yeah, cellular revival, that's also the biggest problem when the body dies, which is that the cells themselves die. When that happens, death is irreversible. So if you can reverse that, then you can actually still revive the human being. And that is touched on in "The Cost of Living."

Even more disquieting is the somewhat thematically similar "Surrogate," already mentioned by John and Gabriela, by Daniel Carlos Tan from *Science Fiction: Filipino Fiction for Young Adults* (hereinafter referred to as "volume 2"), a "Stepford wives" kind of tale that exacerbates the "uncanny valley" problem, with reference to robots and artificial intelligence, with deftly handled touches on issues of infidelity, longing, guilt, and familial love. I love the language of the girl. She's so mad. It's reminiscent of an excellent episode of the sci-fi TV series *Black Mirror*, it's an excellent TV show, and both present scientific innovations in artificial life forms and uploading consciousness that can definitely be anticipated in the near future. Creating robots that very closely resemble humans (a trope that's also used in Raymund P. Reyes's cute, coming-of-age story "The Romeo Robot" in Volume 2) is certainly a possibility now, with 3D printing technology a boon for creating real skin. It's fairly difficult right now to recreate a blood vessel with 3D printers, but once we achieve that, probably in the next two years, three years, we're off to producing artificial lifeforms in large bunches. For various purposes, but still creepy. Yes, in our own houses.

Right now, there is an artificial lifeform. In 2010, the first official artificial lifeform was created in laboratories of Craig Venter, the same person who led the

Human Genome Project. And it's called Synthia, with an s. Synthetic organism coming from a bacterial template that was mixed. An entirely new organism, and it has a lot of various applications . . . It's related somewhat in that it's an artificial lifeform.

The "Surrogate" story is actually creepy. But we'd have to wait a while longer for true consciousness uploading. That's because up until now, we do not everything there is to know about the brain and its functions (including memory), much less something as abstract as awareness and consciousness.

What we do know, which I would like to share, especially with those with no programs in the sciences, is that that myth of us using only 10 percent of our brain? That's not true. You are *using* all the parts of your brain. Just not at the same time. But you are using all the parts of your brain, because it that weren't the case, part of your brain will atrophy and you die. I hate that idea. And scientists say that idea.

Epigenetics, which is the study of how environmental factors can change gene expression and thereby pass on physical changes to the next generation, without changing DNA, is touched on subtly in CP Coulter's "The 13th Unit" in volume 2, though the term is never used. I don't even know if CP Coulter intended to use the epigenetics concept for that. Epigenetics is gaining ground in the scientific community particularly in the context of revolutions in the understanding of evolution. Because, normally, when we talk about evolution, we talk about characteristics that are passed on genetically, through DNA changes, through mutations. But now, we have these epigenetic changes which are physical changes that somehow also change the gene expression, so that those gene expression changes are passed on to the next generation.

Induced superpowers are also the novum in Danna Ruth S. Ballesteros's "Ashes/Embers" in volume 1, which could have been much more engaging had it highlighted the Neuroenhancer's functions and provided some sort of an explanation for Joan's apparent self-immolation. Which, as a biologist, I found very hard to believe or accept. I particularly consider the lapse with the Neuroenhancer a missed opportunity, as it would have been very enlightening and interesting to explore how stimulating certain neural networks, neurotransmitters, or brain functions would produce superhuman abilities.

I think at the core of a lot of superhuman powers in Marvel, DC, and all of these, is some form of a telekinetic ability, which has to do with the brain's development.

Of course, all sorts of creatures abound in these two volumes. We have creatures whose descriptions make them almost supernatural (as in Alexander Marcos Osias's

"Oplan Sanction" in volume 1 and Kate Osias's poetic "Mooneater" and Victor Fernando R. Ocampo's engaging "Infinite Degrees of Freedom" in volume 2), which I think a lot of people here in front of me saw as better stories in the collections. The latter's use, in "Infinite Degrees of Freedom," of the "Notochord," a "techno-organic extension of his limbic system," is a deft touch. The limbic system is that part of our brain that's responsible for processing memories and emotions, including fear, so the rampage of young Deo's creations certainly has biological context. We also have, in Katya Oliva-Llego's "Gene RX" in volume 1, caricatures of the typical space invader whose purpose for infiltrating human society is survival of the species. The story could have been more strongly written, though its premise is interesting enough and does touch on the much-discussed Filipino penchant for whitening products . . . Then there are the stories with aliens whose appearance isn't nearly as important as what goes on with the human characters: Nikki Alfar's humorous "The Incipient End of the World" in volume 2 and the superior "Lucky" by Raven Guerrero in Volume 1, which is an exceptionally beautiful story that's easily my favorite among all the twenty-five entries in both volumes. Calling the aliens "Bisitas" in the Filipino context is an inspired touch, in that particular story.

I usually use two criteria for including stories or novels to the reading list of my Biology of Science Fiction class: 1) the strength of the biological novum, how prominent it is in the story, how well thought out it is, if there's enough of it given to us that we can discuss the science behind it; and, of course, 2) the quality of the writing. Given these criteria, I'd consider including "The Cost of Living" and "The 13th Unit," mainly on the first criterion. If it were just a writing class, I'd definitely include "Lucky" and another gem from the superior volume 2, Lakan Umali's "The Ceres Girl."

We panelists were also asked to talk about the Filipino flavor of the science fiction in these texts, which is quite natural given that they were written by Filipinos primarily for a Filipino audience. Volume 1, *Diaspora Ad Astra*, is the one that's more explicitly packaged in this vein, which makes the glaring lack of the unique Filipino flavor, at least in my opinion, rather disappointing, to tell the truth. Most of the stories in this anthology could have just as easily had non-Filipino characters and they would have been the same stories. For me, a random Filipino expletive (*putangina*) or carelessly thrown Filipino word or, most lazily, Filipino names for characters does not make these stories Pinoy Sci-fi. And then there are stories, like Carljoe Javier's "The Day the Sexbomb Dancers Invaded our Brains" in volume 1, that lack all subtlety and hit their readers on the head with as many *masa* culture references that they can.

JNG: *Medyo pa-cute yung* story *na yun*.

RC: *Pa-cute*. To say it mildly. *Baka iniisip n'yo an* Atenean is attacking UP.

The best science fiction takes us to a different world with a sense of intelligent wonder without making us feel disconnected from the real world that we live in. In the "Pinoy-ness" context, the standouts in this regard for me are, from volume 1, Celestine Trinidad's "Taking Gaia," and, from Volume 2, Kim Sarabia's "Jeepney Blues" and Umali's "The Ceres Girl." All three extol the Filipino virtues of resilience and ingenuity without being necessarily preachy about it. "Taking Gaia" and "The Ceres Girl" both highlight the socio economic significance of overseas Filipino workers (OFWs), with the former going the political route and the latter being a more emotional tribute to working mothers and the distance that they are forced to create between themselves and their children. And of course in this story, what greater distance is there. We are talking here about distance between Earth and as asteroid, not between two countries. And in fact they need to use an ANSI code to be able to communicate with each other, delaying by a day their communication. "Jeepney Blues" is that type of story that you may appreciate not during the reading but sometime after you've finished it. At first I found the use of a jeepney and of *lugaw* as overly blatant Filipino-ness in the story, but after thinking about it, it seems to be a cohesive whole that even touches on ecological degradation, which is close to my heart as a conservation biologist. The use of artificially generated cyclones, definitely a possibility, to hasten the ocean's natural turnover process, as well as the intended conversion of the solid waste to atolls or coral substrates, are interesting ideas. It can actually be pursued realistically.

I anticipate more Pinoy sci-fi stories revolving around the unique situation of OFWs but hope that they can be taken to even greater extremes. For example, having Filipinos taking on important roles on many planets in an intergalactic empire could be an amusing play on the idea that Filipinos are everywhere, that they can take over anywhere. More importantly, many other aspects of Filipino society and culture can be seeds for great science fiction. How about something on our ever expanding food culture—our obsession with food trips and taking pictures of and writing blog entries about food? Or something on business process outsourcing, in particular the call center industry? Or our obsession with beauty pageants (a scifi spin to Miss Universe? *Andun na yung pangalan eh*), the unique

Pinoy LGBT culture, our sports obsessions (e.g., basketball, volleyball, school rivalries, etc.), showbiz and love teams, etc. Eliza Victoria's "Rizal" in volume 1 is almost prophetic in how it weaves a story around a government that's hell-bent on eradicating drug addiction. Surely our current political climate is ripe for some more scifi stories on these things?

There have been interesting sci-fi treatments of creatures of Filipino folklore, such as Paolo Chikiamco's *Mythspace*, but I am sure that there are more of such stories that we can tell.

And for this biologist, there is so much potential to developing intelligent and insightful science fiction stories featuring our country's greatest resource: our astounding biodiversity. The Philippines is one of seventeen mega-biodiversity countries and as such is characterized by an exceptional number of endemic species, meaning species that we find only here in the Philippines and nowhere else. It is also richly diverse in ecosystem, whether terrestrial or aquatic. So as far as world-building goes, that's a lot of material to draw from. And stories on Filipino diversity will also bring a lot of attention to the issues, and that's always a good thing. And one of the greatest drivers of biodiversity laws in the Philippines, and actually many parts of the world, is land conversion. Conversion of natural ecosystems to agricultural lands. I think there's a lot of potential science fiction stories that can be made out of that.

Just to end, maybe taking up some points that were mentioned by John and Gabriela, but mostly just to wrap it up, I think part of the reason why science fiction (and this reiterates what was said earlier) hasn't taken flight in the Philippines . . . well, actually, literature if you think about it, for example, sad as it is, you won't earn a lot of money as a Filipino author in the Philippines. It's not as if the literary field is as lucrative as it should be, given how much talent there is among Filipinos. But the science fiction genre in particular is still in its infancy as Gabriela has said. Part of that is I think there's a fundamental lack of appreciation or awareness of science, basic science.

If you think about it, the K-12 educational system that's going to kick in in 2018 but has started already, is going to even lessen that, as some students will be taking science only in Grade 3. Before that, they'd be getting what they know about science from what they read or what they watch on TV. Or what anyone tells them and they believe, what they hear. So there is a fundamental need to understand the science first.

Which is why scientists like myself, and probably my fellow scientists in this panel, would agree, are very appreciative of science fiction because science fiction

is a way to popularize science. It's a way to get science out there, in a package that people would really appreciate and understand. When I teach the biology of science fiction, I always tell my students at the start and at the end, I am not teaching this course to burst bubbles, to ruin your illusions, to make you look at the next science fiction book and say, "Oh, science is accurate; I won't read this anymore. I'll drop it." No, that's not the point. The point is to give them a whole new level of appreciation of the science fiction texts that they read because they'll know the science behind it. And despite the natural tension between science, which is fact-based, and fiction, which is not fact-based, there's beauty to marrying the two. The science fiction genre and studying it as a legitimate literary genre and a way to understand the world in a better way.

Thank you.