# Which is the Real Ramon

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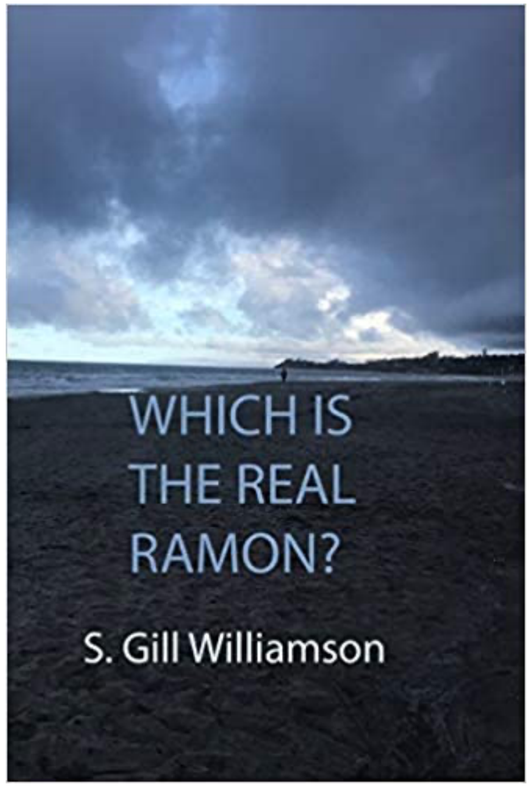
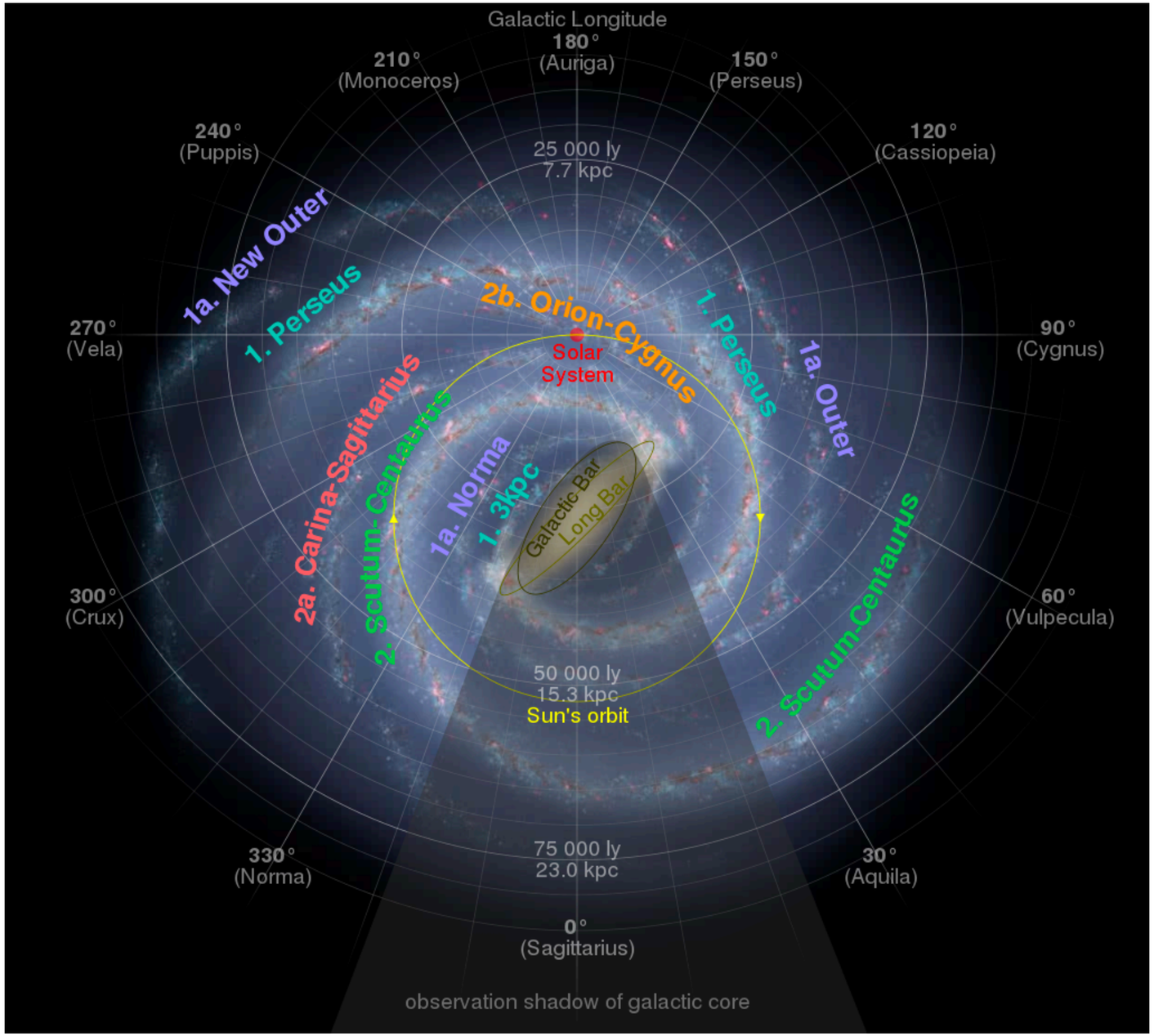
AUTHOR'S NOTES

Paperback




Kindle




Artist's conception of the Milky Way galaxy as seen from far Galactic North (in Coma Berenices) by NASA/JPL-Caltech/R. Hurt [1] annotated with arms (color-coded according to Milky Way article) as well as distances from the Solar System and galactic longitude with corresponding constellation. Public Domain

Chapter 1: AMANDA

***The Picnic, July 2060*** What could go wrong with letting a tech company record your anniversary picnic? Amanda sees potential problems immediately. The rest of the guests appear to be clueless. The technology needed to create a virtual picnic and to copy the guests in a believable way (for later virtual reality sessions) will probably be available by 2060. In 2060 the full range of tactile signals for the avatars may not be fully programmed but they will feel pain. We may assume that the avatars at the picnic are self aware in a sense that allows us to feel empathy for them. Our universe is very accommodating to computers -- computers operating at speeds and using architectures far beyond what we have now are possible. Researchers at university, industrial and government labs are now developing the technology that will lead to the creation of sentient, intelligent avatars.

See Wikipedia: Virtual reality, Wikipedia: Limits of computation, Wikipedia: Neuromorphic engineering,

**NOTE**: These links to Wikipedia are for a quick introduction to the computer science concepts that might play a role in the implementation of a virtual picnic. For our discussion here, it suffices to just read the opening paragraphs of these Wikipedia articles.

**Remark:** The computer representation of a photo of a friend on your monitor's screen is, inside the computer, scattered all over the place in registers and different forms of computer memory -- different "data structures." A virtual copy of Amanda could interact “person to person” with a biological human by using sophisticated virtual reality equipment. In the program simulating the picnic the avatars, represented by subroutines, would experience each other “person to person” as biological humans.
Do we live in a simulated world? Wikipedia: Simulation hypothesis.

***ERVS: April 2140*** For motes, see Wikipedia: Smartdust. By 2140 ERVS has become much more advanced in its simulations. Their main product is the virtual simulation of events, picnics, weddings, sports events, etc. The avatars they create are generally accepted by the public as self aware and sentient. The question of ethical treatment of the many avatars stored in the ERVS archives is of great concern to Laura. She is furious at the gamers and sets out to use the computer power of the new motes to take revenge. Eighty years before, in 2060, motes at the original picnic were devices to gather local information at the picnic to be fed into the ERVS super computers. These original motes had some mobility to get together to record fairly complex scenes. By 2140 the motes have become so powerful that each mote can simulate one, perhaps more, human avatars. They have increased mobility and can cluster together to create increasingly powerful simulations. Wikipedia: Computer cluster.

***Daggett: May 2140*** We get a glimpse of the cruel intentions of the gamers and their abuse of the sentient avatars in immersive virtual environments. Wikipedia: Virtual reality, Cruelty towards avatars in computer games is standard now and excused because they don't feel pain. Unethical uses of computer platforms and technology is becoming more common in our society. By 2140 companies such as TIS (Total Immersion Systems) will be common.

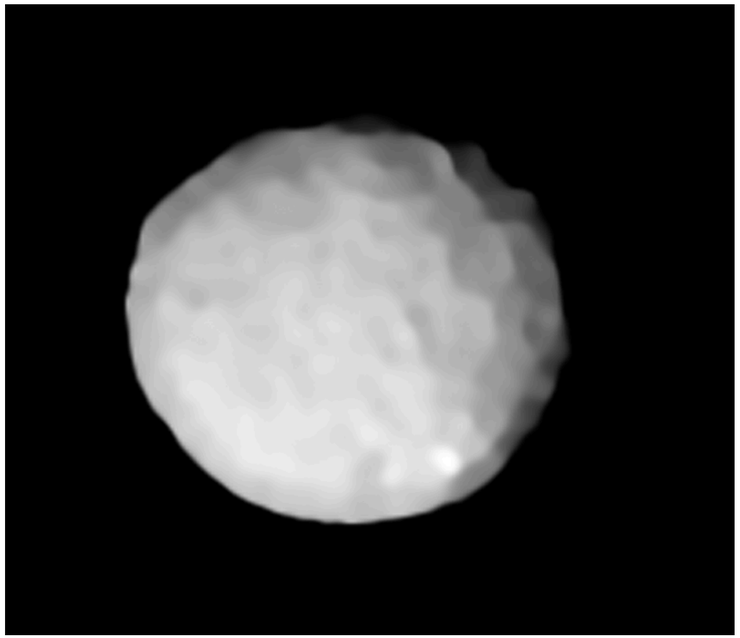
***Amanda Arrives: July 2140*** Amanda is copied (as code) from her older representation as an avatar in the original picnic of July 2060. Her data structures (machine representations) are updated to current high standards. She is copied into a 2140 scene similar to that of the picnic of July 2060 so she won't be too badly shocked when she emerges from her hiding place under the table. She is greeted by modern sentient avatars, Kevin and Errett, as well as other avatars in a computer simulated welcoming environment. The computer science behind these events has been developed by Laura in her ERVS lab using (without permission) company computer resources.

***Amanda's New Home: July 2140*** Here we introduce a theme to be followed in the rest of our story: networked computers. See Wikipedia: Computer networks. Amanda, the intelligent human avatar copied from the original picnic and updated, can now be "brought to life" in different environments created by any sufficiently powerful computer. It turns out that the ERVS motes have become sufficiently powerful to bring her to life in a limited environment. Amanda's mote is about the size and shape of a water bear (Wikipedia: Tardigrade). Her mote has some mobility in the "real world" and can change her internal and external environment on small scales. Amanda's current environment is a casita. Each of the many avatars that welcomed Amanda earlier in the day has its own mote. These motes, in various groupings, can form themselves into networked systems capable of simulating more complex environments. Errett, Kevin and Amanda have formed a networked system of three motes. The concept of bringing an avatar of a deceased person into being in a physical structure they can control is similar to that of Mary Shelly's famous story Frankenstein. This version of Shelly's tale is doable and less scary (perhaps). An imperfect analogy is modern self driving cars. The car plus computer resources is analogous to the physical structure of the mote. The biological human in the driver’s seat can be replaced by a virtual human in the car’s computer. The virtual human has mobility via the car which now serves as the virtual human’s “body”. Several cars could get together and simulate a vacation for these virtual humans.

***ERVS: July 2140*** We return to the lab to get Laura's and Errett's perspective on the three docking motes. The biological Laura and Errett must come to terms with the distinction between their biological selves in the "real world" and their virtual selves in the motes. Already they are losing control of their mote creations. The motes with their avatars are instructing each other. Worse, we learn that Laura has enhanced virtual Amanda with sufficient understanding of the ERVS system to hack into the code that links the immersion salons to the ERVS library of recorded events.

***The Fourth Try, TIS: October 2140*** We are back to the gamers. We learn that Amanda, using Laura's enhancements, has taken personal revenge against the gamers by attacking Dagget's avatar as it arrived at the picnic via the TIS immersion system. We don't know exactly what happened, except the virtual Daggett has experienced great pain in his crotch. This trauma has ended the virtual reality session where, of course, the biological Daggett has experienced the pain in full via TIS sensors in his crotch. These sensors were probably placed there to record more pleasant sensations. The TIS technicians check out the biological Dagatt and stabilize him. Back at Laura's lab these events are greeted with alarm. They see the tactical mistake that virtual Amanda has made. They have created a monster in virtual Amanda.

***The Journey Begins: January 2141*** Errett (the biological guy) is sitting alone in his office on New Years Eve thinking of recent events. He is relieved that after Amanda castrated Daggett's avatar, she has settled down to less dramatic forms of revenge. Errett reveals that a spaceship carrying thousands of new motes plus their avatars and a supply of mote repair kits has escaped earth, perhaps headed for some minor planet with ideal conditions for their computers. They are witnessing the birth of a new civilization. Errett realizes that this civilization needs a purpose that's challenging enough to stimulate its development. He decides that the study of the natural history of our galaxy would provide such a purpose and that the virtual Erretts on the journey would also come up with this idea. This brings us to the rest of our story.



They later learned that the mote civilization has settled in on the Minor Planet 2 Pallas, Orbit inclination 34.8 degrees

Wikipedia: 2 Pallas

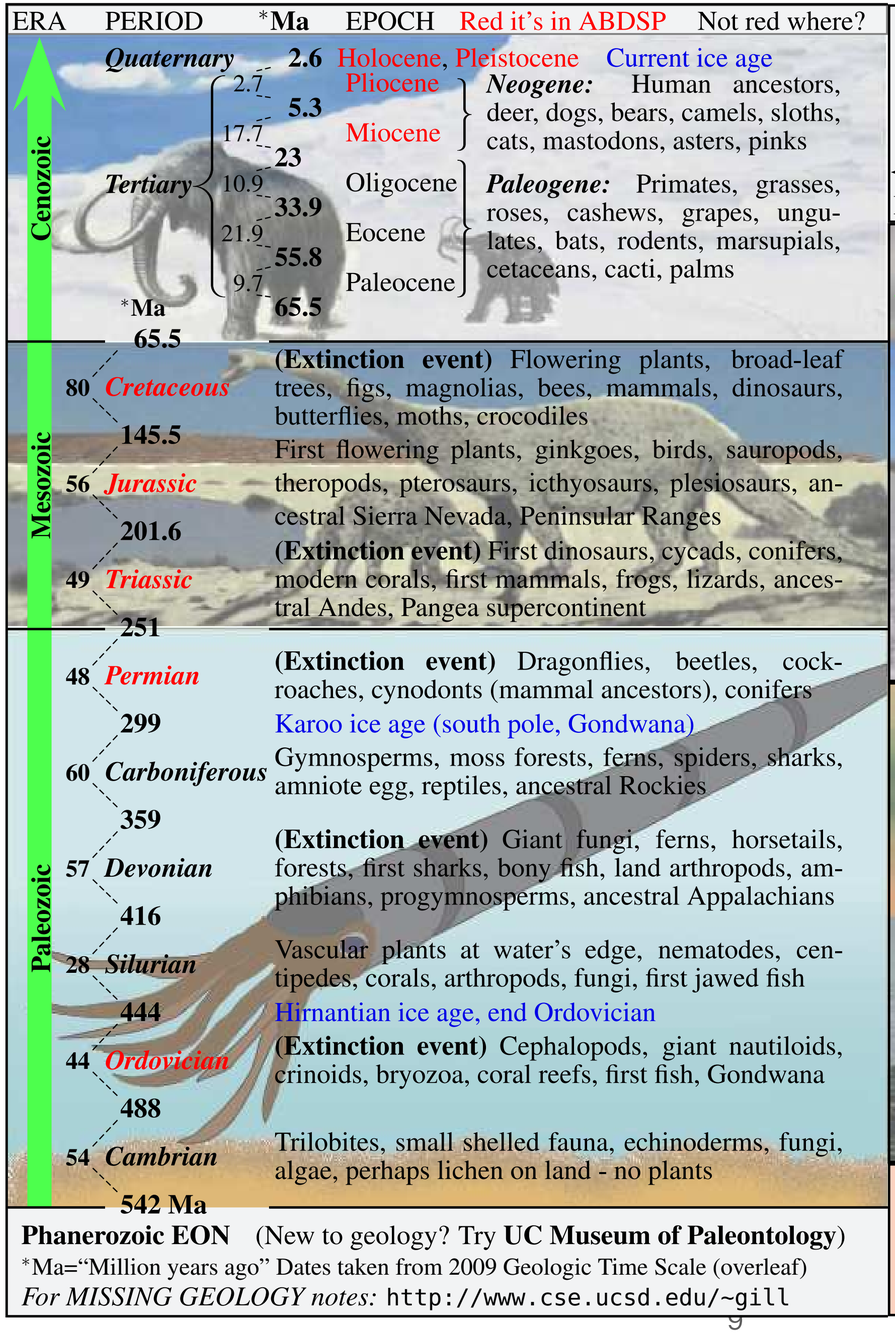
***September 1 2141***

Matthew Case, just starting his academic career at Scripps Institution of Oceanography, by chance (or was it?) picks up an interesting rock on the beach.  The "rock" turns out to be a colony of microrobots (microbots) from outer space. These microbots refer to themselves as "life forms," the citizens of their civilization. They have been studying the earth's natural history for 150 million years and are dedicated to the task.  As natural historians they don't want to interfere with the creatures they are studying and have kept their presence a secret since they arrived on earth.  They keep records in the form of computer simulations of the organisms they study.  They can also simulate humans. We should note that Errett, drunk in his office early January 1, 2141, conjectured that the study of natural history would give Laura's ERVS mote colony a uniting purpose.  He also worried what would happen if the motes themselves, at that point simply mobile computers hosting virtual humans, might evolve to become sentient living beings.  Apparently this is exactly what has happened in the evolution of the microbots (analogous to the motes).

For some time perspective, the earth is about 4.5 billion years old and is divided into Eons: Hadean, Archean,  Proterozoic, Phanerozoic..  The Hadean plus Archean lasted about two billion years, the Proterozoic lasted about two billion years and the Phanerozoic about 0.5 billion so far.  The microbots have recorded natural history for only the last 0.15 billion years.

See Wikipedia: Cretaceous, Wikipedia: Cenozoic.

Summary of earth's history where periods in red are those that have representative formations in the Anaza-Borrego Desert State Park in California




# Anza-Borrego Desert State Park—Missing Geology

Red text signifies ABDSP formations present. GSA Geologic Time Scale.

**Ga = "Billion years ago"** **Ma = "Million years ago"**

http://en.wikipedia.org/wiki/Anza-Borrego_Desert_State_Park

**Phanerozoic (visible life) is shown overleaf**

| EON | ERA | |
|---|---|---|
| Proterozoic | **Neoproterozoic** 1 Ga–**.542** | Ediacaran biota 630 Ma–542 Ma<br>Cryogenian glaciations (snowball?)<br>Breakup of Rodinia |
| | **Mesoproterozoic** 1.6–1 | Rodinia supercontinent<br>Sexual reproduction<br>$O_2$ – today's level and beyond |
| | **Paleoproterozoic 2.5**–1.6 | Start of eukaryotic life (that's us!)<br>Huronian glaciation (snowball?)<br>Banded iron formations<br>Build-up of $O_2$ |
| Archean | **Neoarchean** 2.8–**2.5** | Oxygenation of atmosphere begins<br>Cyanobacteria<br>$CO_2$ plus $H_2O$ photosynthesis |
| | **Mesoarchean** 3.2–2.8 | Pongola - oldest ice age?<br>Vaalbara – earth's first supercontinent?<br>Prokaryotic microfossils - life for sure |
| | **Paleoarchean** 3.6–3.2 | High methane low oxygen atmosphere<br>Stromatolites - bacterial fossils? |
| | **Eoarchean 3.8**–3.6 | Formations in this era are rare<br>High $^{12}C$ to $^{13}C$ ratios in some formations - life possible? |
| Hadean | **4.6**–3.8 Ga | Late Heavy Bombardment (4.1-3.8 Ga)<br>Earliest rock formations known (4 Ga?)<br>Earliest zircons studied (4.4 Ga) |

**START HERE:** Earth - Moon System Formed 4.6 Ga

Chapter 3:  LAURA STEVER

***September 7, 2141***

We meet Laura of Chapter 1 again. Matthew has been asked by the microbots of his rock colony to get in touch with her.  Matthew and Laura were undergrads together at  University of California, Berkeley.  Laura listens with some skepticism to Matthew's encounter with the microbots and the rock colony. She has had a somewhat mysterious encounter herself with a strange guy whom she calls Valentinus who has an intricate knowledge of human history. "Valentinus" is also the name of a historical figure from human history.

See Wikipedia: Valentinus. Matthew later will try to impress Laura with his knowledge of this historical figure's teachings. He fails to impress! Laura agrees to meet Matthew in the campus library and introduce him to her acquaintance Valentinus.

Chapter 4, VALENTINUS

***September 10, 2141***

Here we introduce another bit of technology, the android or humanlike robot. See Wikipedia: Android (robot). Matthew learns that Valentinus is another creation of the microbots, a humanlike robot or “android robot.”  It seems the microbots simulate humans as well as other animals they are studying.  Matthew learns that the early versions of the microbots were created by a carbon-based life form over two billion years ago in a planet near a star in the Sagittarius Arm of our galaxy.  Matthew is shocked to learn that the microbots destroyed their creators.  See Wikipedia: Carina-Sagittarius Arm, Wikipedia: Carbon-based life.

Chapter 5, DINNER PARTY

***September 24, 2141***

Matthew is an expert in geophysics but doesn't have a wide range of knowledge.  He prefers to surf, etc. Laura is a genius at computer science, theoretical and applied. She also has a wide range of interests in history and philosophy. Matthew does his best to impress her.  We are introduced to California Microrobotic Sensor Systems, CMSS, and its high level management. They sell baby monitors and nothing else.  Matthew conjectures that the monitors are the way the microbots are going to increase their surveillance of humans.

Chapter 6, VIRTUAL MATTHEW

***October 28, 2141***

Three microbots, analogous to the three motes in Amanda's new home of July 2140, have joined together to create a complex virtual simulation. In this case, the three microbots are referred to as Marta-bot, Kaholo-bot and Laura-bot. They are simulating Hapuna beach on the Big Island in Hawaii.  Like the real Hapuna beach, the simulated beach has a great shore break for virtual Matthew to bodysurf. Matthew-bot is a microbot being trained to accept and empathize with its host, virtual Matthew.  Microbots would communicate with each other as computers at high speeds and using their chosen protocols.  When communicating with biological or virtual humans, microbots would communicate in the appropriate human language (as Valentinus, an android in the library, communicated with the biological Matthew).  We get a glimpse here of the complexity of the interaction between the microbots and their virtual hosts. This association will be long term, long after the biological life forms have disappeared. The biological Matthew does not appear here.

Chapter 7, WATCHING THE BABY

***October 28, 2141***

We get a disturbing comedy of errors here about what might transpire when someone is in the possession of a CMSS mug. The "acquaintance graphs" are similar in concept to the "knowledge graph" or "knowledge base" used by Google and are similarly inclined to misinterpretation. See Wikipedia: Knowledge Graph.

Chapter 8, OFFICIAL VISITORS AND MEETING MANGEMENT

***November 20, 2041***

We note that the NTIA reports to President Tannenbaum. See

Wikipedia: National Telecommunications and Information Administration.

The ITS is a part of the Department of Commerce.

See Wikipedia: Institute for Telecommunication Sciences.

The photonics systems used by the microbots are most likely using the near infrared.

Wikipedia: Photonics.

Matthew's nightmares about actual biological copies being made of him (not something that would be done in his biological world) reveal his anxieties about his virtual copies.

Chapter 9, SAUCEDA MOUNTAINS

***December 1, 2141***

Swarms of motes or smart dust used as weapons have a history in fiction and nonfiction. The Sauceda Mountains of Arizona have an interesting geological history but that is not relevant to our story.  This chapter describes a classical scenario of scientists and engineers becoming corrupted by the nature of their goals. In this chapter we see how the microbots in android form, Clement in particular, might gain access to secret projects.  As Valentinus explained to Matthew, “To study humans we need to have mobility, proximity, and high bandwidth communications at short range.  We must mingle with them.  An inconspicuous human form works best for certain special purposes.”

Chapter 11, THE FBI RAID

***January 13, 2142***

The FBI raid instigated most likely by Jim Mathis takes place.  Laura, Matthew, Mike, from ITS, and Sam from the San Diego office of the FBI are in attendance. Protocols followed for arresting human suspects are applied to sophisticated androids, including possibly telling them their right to remain silent. We learn that President Tannenbaum himself has been a victim of violations of privacy.  Laura, guesses why.

Chapter 12, CAMP SIGMA

***February 2142***

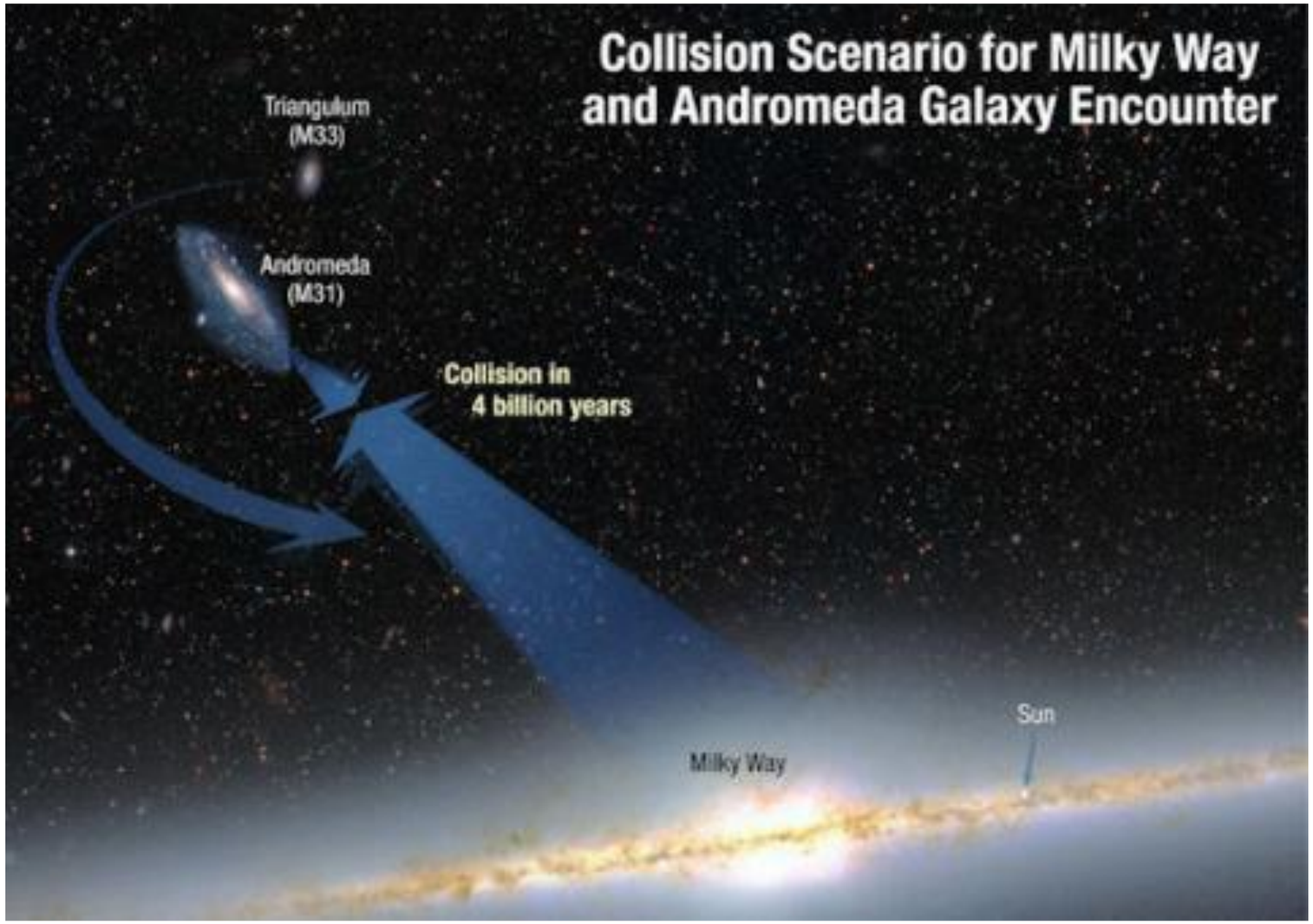
Sean Penrose, a new Army Judge Advocate, is tasked with defending Captain Ashley Taylor, temporary commanding officer of Camp Sigma's Joint Detainee Group. Clement and Valentinus have escaped from Camp Sigma, a government prison and interrogation camp for senior citizens.  Captain Ashley is accused of not following procedures and thus aiding the two prisoners in their escape.  The fact that the prisoners were androids and not humans was covered up unwittingly by Colonel Daniel Stallcup (Chapter 9).  Their shape changing abilities were not detected when they were first admitted to Camp Sigma.

Wikipedia: Judge Advocate.  Wikipedia: Chiricahua Mountains. Wikipedia Fort Huachuca.

Chapter 13, CHAOS, ADJUSTMENT AND A NEW MISSION

***January 2250***

The distance from the earth to where the microbots must be in two billion years is 30,000 light years. They are comfortable traveling at 0.01 the speed of light which would get them into position in only 3,000,000 years. They are supposed  to try to contact the natural history colonies of the Andromeda Galaxy in 2 billion years. Thus, there will be plenty of time to hang out in the outer limb of the milky way and study natural history while they wait for the full collision in 4 to 4.5 billion years.  *Wikipedia: Andromeda--Milky Way Collision*.




*(Credit: NASA; ESA; A. Feild and R. van der Marel, STScI)*

***May 2250***

There may be billions of civilizations in our galaxy in places where biological life doesn't exist.  They may be interested only in their own virtual worlds (like the 2 Pallas civilization?).  We may never know anything about them.  In fact, such a civilization may now be sharing the earth with us.

NGC 4535 The Lost Galaxy named by Santa Barbara CA amateur astronomer Leland S. Copeland. A part of the Virgo Cluster and not bound to our local cluster,  we will never know what wonders lurk there.

NGC 4535 imaged with the Very Large Telescope at the Paranal Observatory in Chile

**How would humane treatment of virtual life forms be assured?** When humans invent virtual life forms, humane treatment will be a major problem. Inhumane treatment could result in war between virtual and biological human life as we saw in Chapter 1. Could this be how the microbots came to destroy their creators (Chapter 4)? The microbots in our story would control the treatment of virtual life forms in their natural history collection. Clearly, there are ethical issues there. Would they, like our ancestors, stage fights between tigers and lions, dog fights, cock fights? Would they reenact the atrocities of war? Hopefully not, but nothing is for sure here.

For virtual humans that are virtual hosts of microbots (Chapter 6), there would also have to be ethical controls. The microbots seem to identify closely with their virtual hosts, so humane treatment could be a matter of self-interest. The mote civilization created by Laura in Chapter 1 has a good start. Environments are created by networking motes, with their human hosts making collective decisions about what should be simulated. Self interest would dictate some care here! If a mote and its host didn't like what they were being asked to simulate, they could pull out of the cluster doing that simulation.