COPPER

Loren Kronemyer

~~ANTHROPOCENE~~

CAPITALOCENE

CHTHULUCENE

PLANTATIONOCENE

22ND CENTURY

SYMBIOCENE

GYNECENE

MANTHROPOCENE

TECHNOCENE

TERRAMETACENE

PYROCENE

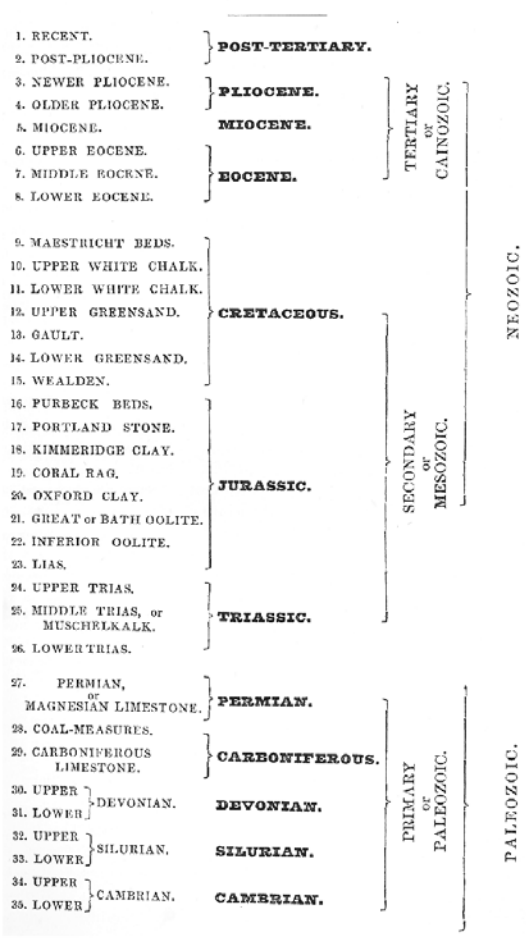
VERMICENE

This book is a provisional timeline of events that are currently unfolding.

It is a series of connected moments. Each moment is a syllable of a name. That name that will define the multimillennial geological epoch we will die in.

To begin in the past, turn to page 4.

To begin in the present, turn to page 23.



ABRIDGED TABLE OF FOSSILIFEROUS STRATA.

1. RECENT.	POST-TERTIARY.		
2. POST-PLIOCENE.			
3. NEWER PLIOCENE.	PLIOCENE.	TERTIARY or CAINOZOIC.	NEOZOIC.
4. OLDER PLIOCENE.			
5. MIOCENE.	MIOCENE.		
6. UPPER EOCENE.	EOCENE.		
7. MIDDLE EOCENE.			
8. LOWER EOCENE.			
9. MAESTRICHT BEDS.	CRETACEOUS.	SECONDARY or MESOZOIC.	
10. UPPER WHITE CHALK.			
11. LOWER WHITE CHALK.			
12. UPPER GREENSAND.			
13. GAULT.			
14. LOWER GREENSAND.			
15. WEALDEN.			
16. PURBECK BEDS.	JURASSIC.		
17. PORTLAND STONE.			
18. KIMMERIDGE CLAY.			
19. CORAL RAG.			
20. OXFORD CLAY.			
21. GREAT or BATH OOLITE.			
22. INFERIOR OOLITE.			
23. LIAS.			
24. UPPER TRIAS.	TRIASSIC.		
25. MIDDLE TRIAS, or MUSCHELKALK.			
26. LOWER TRIAS.			
27. PERMIAN, or MAGNESIAN LIMESTONE.	PERMIAN.	PRIMARY or PALÆOZOIC.	PALÆOZOIC.
28. COAL-MEASURES.	CARBONIFEROUS.		
29. CARBONIFEROUS LIMESTONE.			
30. UPPER / 31. LOWER — DEVONIAN.	DEVONIAN.		
32. UPPER / 33. LOWER — SILURIAN.	SILURIAN.		
34. UPPER / 35. LOWER — CAMBRIAN.	CAMBRIAN.		

The chronostratigraphic chart of Charles Lyell (1855, p.109, "Abridged table of fossiliferous strata")

19th Century
1855

Where to begin? He was always a collector, even as a young boy tramping through the heath ringed by the English Channel. From the beginning, Charles Lyell had an aptitude for containing and naming things. In those years, he built up his collection of specimen jars, each like a lantern containing the spark of a living thing. Every butterfly or beetle would be labelled and kept, a catalogue of the orbits he walked around his family's estate.

By age 58, Lyell has circumnavigated both the new world and the old. He is a scholar of influence, benighted, friend of the royal family, in the company of great men. As a Victorian scientist, Lyell's work is to experience the world, then classify it according to its uniformity.

His first books, Principles of Geology (1830) and Elements of Geology (1838) secured his eminent standing, but he continued to make revisions to them throughout his life. Lyell knows that things build up in layers. He knows that the ground is teeming with facts, and if you aggregate enough facts, they reveal legible principles. This accumulation of principles reveals a layer. This layer requires a name.

And so the type is set for a table of names, the first chart of Earth´s geological history. The words begin on the left, a narrow column of thirty-five numbered names, representing baby steps of geologic time. 1. RECENT. 2. POST-PLIOCENE. 3. NEWER PLIOCENE. 4. OLDER PLIOCENE. 5. MIOCENE. They descend back in time, in order of newest to oldest, the ages of Earth´s history as inscribed through fossils in strata, as observed and named by Lyell and his colleagues.

Moving right, set in a stout typeface, the next column lists the twelve names that group these ages into epochs. Beginning with POST-TERTIARY. and PLIOCENE. and MIOCENE. ending with DEVONIAN. and SILURIAN. and CAMBRIAN. these names take the paces of geological time in hasty strides. For Lyell, each name recalls the memory of the friend, the mentor, the student, or rival who minted it. Memories of outings, letters, disputes, and negotiations among his peers, the nascent society of the science of geology.

Indented further, a list of three names, each with a provisional caveat: TERTIARY *or* CAINOZOIC. SECONDARY *or* MESOZOIC. PRIMARY *or* PALEOZOIC. The names for these periods have not been set in stone, but they act as serviceable placeholders to indicate great leaps of time, inviting further inquiry.

Finally, on the rightmost margin, divided by two swooping brackets, Lyell writes the two eras of Earth´s history, as yet observed: NEOZOIC. and PALEOZOIC. Enormous, soaring swathes of time that span unknown multitudes of events and collisions, yet each their own distinct passage in history, separated by an observable boundary. This is the birth of the timeline known as The Geological Time Scale.

Letters are placed onto blocks, ink is rolled onto letters, paper is pressed into ink. Lyell regards his Abridged Table of Fossiliferous Strata. It is the first in a succession of detailed diagrams that divide Earth´s history into hierarchies of interrelated fossils. Refining this timeline would become the basis of a science known as chronostratigraphy. 165 years of revisions later, the principles of the Geological Time Scale remain mostly the same. Lyell´s draft is still the basis of the geological timeline we live in today. Time itself may be written by rocks, but timelines are written by people.

To go deeper,
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To go shallower,
turn to page 21.

50,000 years

Lyell and his kind left many names in their wake. The Victorian empiricists were obsessed with naming, casting themselves in the starring role as Adam in an unsolicited remake of the Garden of Eden. Names for everything: lakes, mountains, rocks, plants, animals, roads, feelings, seasons, ships. Reusing names over and over, far and wide, names that got more powerful through repetition and dilution. Victoria: a state in the eastern half of Australia, *Victoria amazonica,* a 3 meter wide waterlily that lives in the Amazon river basin. Naming as claiming, several generations deep, a shallow pool that I was born into.

Once I visited a herbarium, a place where samples of plants are catalogued in a library representing the hierarchical organization of their genetics. A botanist there told me that more new species of plants are discovered within the walls of the herbarium itself than growing wild in the field. The process of sorting and labelling the plants within the Linnaen taxonomy routinely obscures or erases entire species.

Acts of naming can be a form of violence. Erasing names, killing knowledge, is part of the program of colonial genocide wherever it occurs. In their frenzy of nomenclature, my forebearers

tried to kill names with roots 50,000 years deep. Names carried across land bridges now sunken, names honed over the course of ice ages. Some names have been lost, but many have persisted, and many more are waiting to be reawakened. That´s not my story to tell, but I speak those names when I am invited to.

Where to begin the task of naming our current chapter of time? I begin on an island with a name that has been revived through careful work, restored in the aftermath of epistemicide: *lutruwita*. This name comes from a language, *palawa kani,* that is coming to life, blossoming in mouths, over airwaves, and on maps and road signs, thanks to the effort of the Tasmanian Aboriginal Centre. The language is a reconstruction, painstakingly woven anew from a variety of historical sources and memories. Its syllables are born from this island, containing imprints of its waters and rocks and seasons and people, thousands of generations deep.

The complex contours of the world will outweather any flimsy labels that seek to flatten them into linear order. And so, as we mark the first point on our provisional timeline, we begin with the understanding that all timelines are provisional.

To go deeper,
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To go shallower,
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Grand Unification Epoch
10^{-36} seconds after the creation of the universe.

Maybe it´s cliché to begin a timeline in our universe´s youth, but here we are. There are things worth observing here, at the remote edge of space-time. As we travel far away from Earth, we move back deeper into cosmological time. The things we once knew fall away, combining back into one another as energies yet to be expressed. We travel back to begin our timeline among forces set in motion.

We arrive at The Grand Unification Epoch. This is a chapter in deepest time, but it is also a tangible place. It draws a perimeter around the present in every direction, echoing in our ears through traces we can sense. Somewhere, it´s happening right now.

This epoch begins shortly after the big bang, the birth of the universe, and the invention of distance. Prior to the bang, there was no space between us at all. There was no such thing as emptiness. All forces of nature were unified, and we were so hot that it is impossible for particles or matter to exist. But something changed, and now we´ve just begun the long journey of spreading out, cooling down, and becoming alien from one another.

The spreading and cooling of the universe causes the first force to manifest, condensing out of the unified field: gravity. Nowadays, in Earth-time, gravity feels familiar, present, and intimately inevitable. You experience gravity as the thing which pulls your body deeper into Earth´s embrace. Gravity tugs at you from Earth´s core, a gentle reminder. Ultimately, it´s the force responsible for crumbling your bones and buildings into sediment, wrapping the planet in layer after layer of strata. The Grand Unification Epoch is gravity´s birthday.

10^{-36} seconds after the creation of the universe, The Grand Unification Epoch ends, and we enter the Electroweak epoch. This epoch celebrates the birth of the ´Strong´ nuclear force, the second force to differentiate into the universe, and aptly named as the strongest thing we´ve seen so far. It´s what´s holding you together, binding the tiniest individual pieces of matter that become the particles that become the nuclei of atoms. It is also the engine that produces starlight, although at this time in the universe´s youth, the stars still have not turned on. This terrain is still dark and mysterious. It recedes quickly into the past.