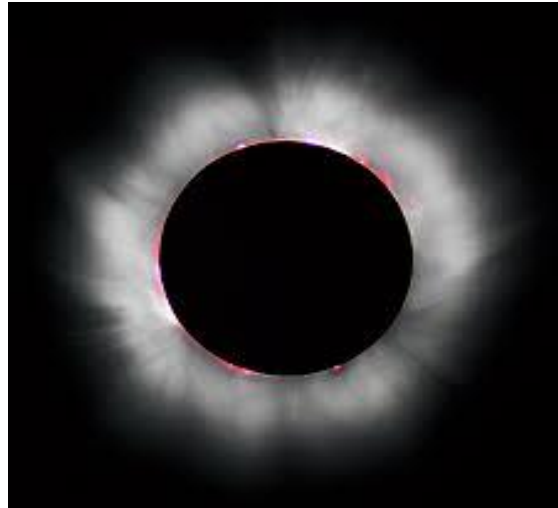


Chapter Two:

Eclipse Miracle

The Basics: What is a Solar Eclipse and Why Should we Care?



Total Solar Eclipse—Photo from NASA

What is a Solar Eclipse?

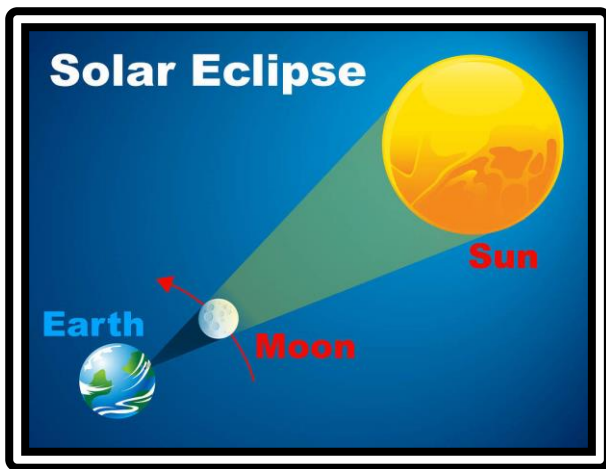
A solar eclipse happens from our perspective when the moon goes in front of the sun.

Of course, any object can eclipse any other object depending on distance and perspective. I can eclipse a cat from your perspective if I walk in front of it. You can also eclipse a hundred-foot tree with your thumb if the tree is far enough away. You can do the same with a mountain, or a million galaxies for that matter. The action of eclipse is an action of perspective. There is a distinctive difference in these analogies and the reality of the solar eclipse. Sticking my thumb out may eclipse a tree, but it does not cast a perfect small tree-like shadow. Also, the tree is not an enormous cosmic light furnace nor my thumb an orbiting satellite.

The alignment of sun and moon to our perspective, and the shadow cast by their alignment are what make solar eclipses peculiar. The sun is 400 times bigger than the moon and also 400 times further away. During a complete solar eclipse, these two objects line up and the shadow cast on earth is a small, perfect representation of that spherical union. When the Sun is in total eclipse, it's the only time when we can stare at the sun without damaging our eyes. It is also the only time that the Corona of the sun is visible.

Lunar eclipses are very different. In lunar eclipses, the moon enters the earth's shadow. That is a darkening of the lunar surface, not an obscuring of the surface, as what happens in a solar eclipse.

One of the oddest elements of the total solar eclipse is the nature of that darkest part of the shadow which reaches the earth. In our daily lives, we are accustomed to shadows that are either larger than the object casting the shadow, or roughly the same size. But the moon's umbral shadow during a total solar eclipse is anywhere from $\frac{1}{2}$ mile to 150 miles wide, far smaller than the diameter of the moon. You can experiment with this yourself. Try to artificially cast a shadow that is smaller than the object you are shining the light on. Try with a flashlight and a golf ball. It doesn't work, at least visibly.



That's because there are different parts to a shadow. The center point of a shadow, the umbra, is the darkest part of a shadow. During a total eclipse, the moon creates a pinpoint shadow on earth as it goes before the sun. The Moon's umbra is only 380,000 km long, just long enough for the tip to touch the Earth but not large enough to cover the entire Earth. This peculiar design creates rarity.

An Umbral shadow is like the Tip of a Cosmic pen-
Image courtesy of NASA

A larger area of partial shadow extends thousands of miles out from the narrow umbral path.

Solar eclipses only happen at a new moon. That's when the Moon is closest to the plane of the Earth's orbit. If the Moon were in a perfectly circular orbit and in the same orbital plane as Earth, there would be total solar eclipses every new moon. But because the Moon's orbit is tilted at about 5 degrees to Earth's orbit, its shadow usually misses Earth. This creates both geographic variation and rarity.

The moon varies in distance every month from earth from about 222,000 miles to 253,000 miles away. Difference in distance changes the nature of eclipses. The moon is closest to the earth for total eclipses and farther away for ring of fires

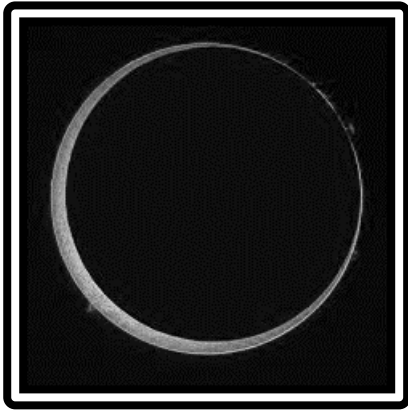
Solar (and lunar) eclipses happen during eclipse "seasons". Eclipse seasons occur every year separated by 173-day spans (though you'll often see 177 day intervals for actual eclipses). Two eclipse seasons make up an eclipse (Draconic) year of 346.62 days. Some kind of solar eclipse will happen during each of these seasons. Like lunar years, draconic years rotate through our solar year. The beginning of the lunar and draconic dates happen differently on our common calendar every day. As of this writing, for instance, the Chinese New Year was on Jan 22 and will be different each year. The Draconic calendar is similarly odd, but I assume it is new year's is probably near April 17 here in 2023.

There are rarely more than two complete eclipses per year. There are 4 types of solar eclipses:



Partial solar eclipses are just what they sound like. The moon only partly goes in front of the sun. Partial solar eclipses comprise about 35% of all eclipses. Some of these can be impressive, but many can easily occur without anyone visually noticing. This book does not chronicle partial eclipses except occasionally as they relate to dates. Complete eclipses create a large area of partiality as well. Most online resources map this entire area. I avoid mapping partial areas as I find them distracting.

Photo courtesy NASA



Annular (Ring of Fire) Eclipses (left) are a “complete” eclipse. The moon goes in front of the sun completely. However, the moon is slightly farther away from earth than it is for total eclipses, so the disc of the moon leaves a sunny Ring of Fire around its dark face. They comprise about 33% of solar eclipses.

Photo courtesy NASA

Hybrid Eclipses are part “ring of fire” and part total. A path of annularity (ring of fire) will be mixed with a brief total eclipse in a very thin line. Thus, during a Hybrid, the apparent size of the moon is very closely aligned with the apparent diameter of the

sun. It will be very close to a 100% match. The May 9 1948 solar eclipse (classified as a ring of fire by some) that divided North and South Korea was 99.9999% total. The Exmouth Australia Hybrid 420 eclipse of Apr 20 2023 had an incredible 100.00% coverage. The Hybrid eclipse that passed near San Francisco on April 28 1930 had a path of totality only 1/3 of a mile wide, not much more than a big city block, and totality would have lasted a few seconds. Hybrids are the rarest complete eclipse, comprising less than 5% of all solar eclipses.



Total eclipses have been called “the grandest spectacle in all of nature”. On many levels they are, aside from supernovas, the rarest possible cosmic phenomenon visible from earth. Far less humans (by orders of magnitudes) have seen a total eclipse than have seen a comet. Total eclipses require alignment between the centers of the Sun and Moon and a lucky placement of the observer. Total solar eclipses occur on average about once every 18 months somewhere on earth. But they appear very rarely at any given place on Earth, on average perhaps once every 375 to 400 years, depending on who is calculating.

Photo courtesy NASA

Annular eclipses are nearly as rare as totals but tend to have a slightly wider path of “annularity”. So it may be that any given spot on earth averages a complete eclipse of some kind every 150 years or so. Averages are rarely realities. The vast majority of people live and die without ever seeing a complete eclipse, be it total, hybrid, or ring of fire. Many people have the opportunity to witness a partial solar eclipse at some point, depending on weather.

Are Solar Eclipses Rare?

Good question. It depends on what you define as rare. Some information sources insist that solar eclipses are common. For instance, *Space.com* says this on its website:

“It's a popular misconception that solar eclipses are rare, but, in fact, they happen on average once every eighteen months”. -Space.com

Hmm. Well, there we go. But what is rarity? Is a moving thin line shadow turning day to night for a few minutes on 1/400th of a planet's surface once every 18 months rare? Depends on your perspective, I suppose. Such an event seems to me quite rare. Solar eclipses certainly don't happen a lot in any one place. Indeed, complete (especially total) solar eclipses can go a *very* long time without returning to any specific location.

The entire continental USA (all 48 states) went 38 years without a total eclipse in its boundaries between the eclipses of 1979 and 2017. Those two eclipses combined brought totality to much less than 10% of the USA's land mass. From the birth of the USA in 1776 to 2017, there were only 20 total solar eclipses within the boundaries of the continental USA. That means that a total solar eclipse occurred in the USA .0002% of the days. All told, less than 2 hours in nearly 250 years was spent with somewhere in totality. Seems pretty rare. But then, I'm no expert, like space.com!

Rome hasn't had a total eclipse since 1386.

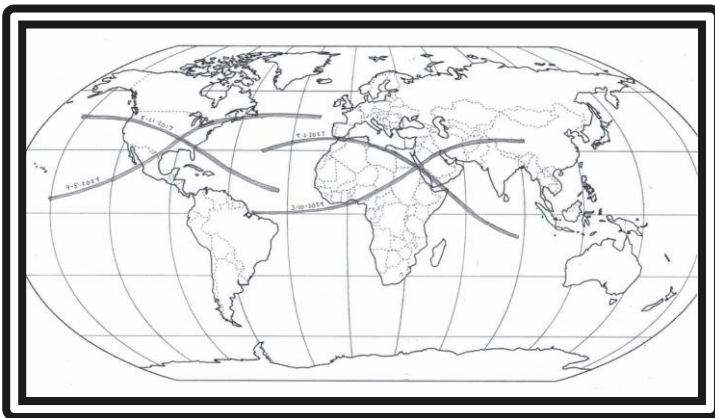
Toronto has not had a Total Solar Eclipse since 1142.

Sacramento has not had one since 1084.

Jerusalem hasn't had a Total solar eclipse since 993 AD and won't have another one until the 2300's.

Computing all those endless possibilities is not really the issue. The reality is this: the earth is a rather big place, about 200 million square miles. The path of a complete eclipse is thin, usually between 50 and 150 miles wide. That path can go for maybe ten thousand miles. The path of a total eclipse can thus roughly cover an average of about 500,000 to 700,000 square miles. There is only one total eclipse on average every 18 months, and it only takes a few hours to traverse its path. It brings totality to any spot for 7 minutes or less. Any one spot has about a one in 400 chance of seeing one any year.

Here is that image again.



Is truth served by saying they are not rare? Are “popular misconceptions” needing to be corrected? What's almost as peculiar as solar eclipses themselves are repeated assertions that they *aren't* exceptionally peculiar. It's odd to live in such a miraculous world where deliberate efforts are made to downplay how amazingly bizarre our situation is. Perhaps it is precisely the rarity of the complete solar eclipse that allows for its non-consideration, for lack of a better word. They actually occur infrequently enough that they can be glossed over, and indeed, not heartily studied-even by many astronomers!

The Sun is the Same Size as the Moon in the Sky

The formation of intelligent life required a great deal of favorable conditions. The cosmic, molecular and biological synchronicities necessary for existence provide a continually growing body of evidence for an intelligent and active Designer. Nevertheless, such evidence is generally dismissed as coincidence by scientific orthodoxy, and likely will be until the end of the story.

While the science of Intelligent Design is generally focused on the extraordinary constructions of the things necessary for life, a much-neglected piece of evidence for Intelligent Design is to be found outside of conditions linked to necessity. Aesthetic (meaning artistic) evidence is placed directly in view of all the world, the symmetry of the two visible spheres in the sky.

Apparent Size: The sun and moon are both .5-degree angular diameter in earth's 360-degree sky. That's about the size of a pea held at arm's length. Sun and Moon often seem to appear larger than that, particularly when they rise and set, but that psychological illusion is not the subject of this work. The sun is essentially the same apparent size as the moon in the sky.

The orbits of the Moon around the Earth, and the Earth around the Sun are not perfectly circular but slightly elliptical, so the apparent angular diameters vary a bit. Still, the similarity in size remains very close. Sun and Moon average 98% similarity in size. So, on average, if you use a pea, 98% similarity would be the difference between a pea that was 12 millimeters wide and one that was 11.76 millimeters held at arm's length. The difference between the apparent size of those peas would be .24 millimeters, equal to about twice the width of a human hair perceived at a three-foot distance. If you considered basketballs held at 80-foot distances. 98 % similarity would mean one basketball was 25.6 centimeters wide and the other 25.1 centimeters 80 feet away. Obviously, there could be little perceptible difference...and perception is what this phenomenon is all about.

Such is the difference between average distances. The average, as we all know, is rarely the reality. As the moon's orbit swings between 225 and 253 thousand miles away, it can regularly line up nearly perfectly with the sun so that the percentage similarity shifts to 100%. The recent hybrid eclipse in Exmouth, Australia in 2023 featured an astounding 100.00% coverage. When the moon is closer to earth and the apparent size of the Moon appears slightly larger than the sun, from 101% up to 104%, it allows for the perfection of the total solar eclipse phenomenon.

Because the Moon's orbit seems to be moving away from earth (apparently 1.5 inches a year), astronomers tend to say that in the distant past, the moon appeared much larger than the Sun. Likewise, in the distant future, the Moon would appear smaller. This is a unique time. Apparently, intelligent life appeared upon earth while the Sun/Moon diameter is essentially identical.

Facts and figures:

Actual sizes: The Sun is 865,370 miles.

The diameter of the Moon is 2,159 miles.

There is about a 400.5 to 1 size ratio between sun and moon. That doesn't change.

Actual distances: The Sun is an “average” of 93 million miles from earth, but actual distance can vary between 91.5 million miles (147 million km) and 94.5 million miles (152 million km). Earth's orbit is also an ellipse. Over the course of the year, earth moves closest to the Sun (called perihelion), usually around January 3rd. It reaches its farthest position from the Sun (called aphelion) around July 4th.

The Moon's orbit around the Earth is also elliptical and varies between 225,000 thousand miles (called perigee) and 252,000 miles (called apogee) over the course of 27 days. On average, the Moon is 238,000 miles away. In other words, two elliptical orbits are at work with earth, sun and moon, constantly changing the perceived angular diameters of sun and moon by very slight degrees. Generally, even the most detail-oriented astronomers just simply say the sun is 400 times bigger than moon and 400 times further away. For one instance, when the Sun is 92 million miles away and the moon is 230 thousand, the Moon is exactly 400 times closer than the Sun.

Comprehending the Actual Sizes and Distances Involved

To comprehend the scale of this cosmic reality is not easy. The vast distances involved are impossible to simulate in a published medium. You just can't draw a picture of an object that is 400 times bigger and 400 times further away than something and then put it on a page. It must be done with words.

We'll substitute a one-foot wide (30cm) basketball for planet earth.

The Moon will then be a softball, about 4 inches (10 cm) wide. At that size ratio, the moon will be 34 feet away from Earth, a lot farther than many people realize.

Given that model ratio of the earth as a basketball and the moon as a softball 34 feet away, how big and far away is the sun? Well, the Sun would be a sphere the size of a 15-story building (133 feet in each direction) located about 2 ½ miles away from the basketball.

This gives some idea of the scale which we are dealing with.

It's tough to comprehend this. During a total solar eclipse, sun and moon line up perfectly. They line up so perfectly that sunlight often actually ripples through valleys of the lunar surface, creating what are known as “Bailey's Beads”. It's all quite impossible. But here we are, thinking about it! Peculiar, don't you think?

What were we taught?

Below is a quote defining solar eclipses from *Kids Britannica*, a popular online educational resource. It is by no means unique. Indeed, it's the common description of solar eclipses in both children's and adult educational material, and it certainly sums up the explanations I remember from my youth:

In a solar eclipse the Moon passes between the Sun and Earth. This prevents the Sun's light from reaching Earth. As the Moon passes in front of the Sun, the Moon's shadow sweeps across Earth. The sky gradually grows darker. --Kids Britannica. com

That's it. While nothing about this explanation is untrue, it fails to mention a rather important fact. Namely, the sun is the same size as the moon in sky! The alignment that allows for the most incredible qualities of the phenomenon, such as the appearance of the corona, is ignored. As it turns out, generations of scientists, even eclipse specialists, find a way to downplay that truth.

Certain astonishing facts of our existence are either hidden from us by clever obfuscation or denigrated as “coincidence.” Whether it’s intentional or not is beside the point. What might this mean for the way we have viewed reality, the way we perceive our setting, history and each other?

How about the moon? Is it peculiar?

The Moon is Big relatively: Earth's moon is by far the most significant satellite around any rocky planet in the solar system. Mercury and Venus have no moons. Mars' moons are tiny odd-shaped rocks, barely 15 miles across. All great moons in the solar system outside of our moon belong to the Gas giants. But the earth’s moon is still comparable to those. The largest satellite in the solar system, Jupiter’s Ganymede, is only 1000 miles wider than our moon. Pluto and Charon at the edge of the solar system are really a dual dwarf planet system, being as they are only 12,000 miles apart. Frozen Pluto is smaller than the moon and Charon is a mere 700 miles across.

It makes the tides and more: The moon is the primary force creating our ocean tides, stirring the water and cleaning the seas. Life would likely be impossible without the moon. Also, the moon stabilizes the earth's rotation, making for a more consistent climate and acts as an asteroid shield.

I’ve Just Seen a face: The moon shows only one face to the earth, because it rotates on its axis at the exact same rate which it revolves around the earth. This phenomenon is called tidal locking.

We have bright moonlight! Who else has that?: We have the brightest moonlight known in the Cosmos. Our bright moon gives nighttime a distinct and changeable character with phases that also allow for the establishment of chronological time by creating observable months. and establishes circadian body rhythms in animals and humans. It encourages diverse nocturnal animals.

How about the Sun?

Perfect Sphere: The Sun is the closest thing to a perfect sphere yet observed in nature. It has less than a six mile difference in diameter between north and south axis, despite being 865,000 miles wide.

We are in the perfect place: The huge fusion furnace of the sun provides the source of all life. The Sun holds us in a favorable “Goldilocks Zone”; not too close, not too far...just right! The sun creates proper photosynthesis for plants and proper UV light.

How about the Earth? Are we Peculiar?

We have life: Earth is the only known planet where life exists. Some type of life is found in virtually every place on the surface of earth.

Nice Rotation: Earth's rotational speed is just right for life. If the earth rotated on its axis slower, life would die from overexposure to either heat or cold. Faster rotation would cause environmental chaos.

Right distance from the Moon too: The earth is just the right distance from the moon. If the moon were much closer, huge tides would overflow onto the landscapes. If it were much further away, we would not have our beneficial cleansing tides.

Cool Water: The earth is the only planet known to contain large bodies of liquid water. 70% of the earth is water. Water stabilizes the earth's temperature and provides the chemical foundation for life.

Good gases too: The mixture of gases in our atmosphere is perfect for life. If this chemistry was changed even very slightly, the atmosphere would become poisonous or volatile.

Good size and nice Magnetic Field: Earth is a good-sized planet for life, with excellent gravitational conditions. The earth also has a powerful electro-magnetic shield that protects us from radiation, and an ozone layer to protect us from UV.

We're here: There are intelligent beings on Earth capable of considering such phenomenon. Love, memory, worship, self-sacrifice, music, dance and dreams are peculiar to Earth.

An order that "educates" us to not reckon such peculiarities as the gift of a Creator is peculiar.

How about the Universe? Is it Peculiar?

A wealth of information exists about the many atomic, chemical and gravitational variables finely tuned to allow for any matter at all to properly exist as we know it. Suffice it to say that even being here is practically impossible. Despite this, for nearly 200 years an institutional dogma has taught that everything popped out of nothing for no particular reason at all.

Is life Peculiar? Of course. True Peculiarity is relational.

Existence is odd. Our environment is peculiarly suited to existence. Our ability to intelligently consider this environment and existence is perhaps the strangest reality of all. When you have such a "preponderance of peculiarities", it is reasonable to consider them as evidence of meaning, function and authorship. Odds against intelligent life's coincidental development are so great as to be incalculable. Some say billions to one, some trillions to one. No one has any clue because no one's ever been able to make life happen without previous life already existing. As absurd as these tremendous numbers and conjectures are, many maintain the possibility for coincidence.

But at some point, possibility of coincidence must become impossible. When is that Point?

Some peculiarities seem to demand assessment. When does a phenomenon cease to have the possibility for coincidence? This is not a little question. Can one always say something is coincidence? If your missing wallet turns up in my pocket, should you first turn to the law of coincidence to explain it? We were born into a world that has instituted a coincidental worldview. A kind of "law of coincidence" is tacitly enforced among educational institutions. Any talk of design is dismissed, and its advocates "canceled" and denigrated.

If we pretend life is coincidence, society will reflect that belief. Origin stories have significance. They form the basis of belief systems which lead directly to actions. We will believe *something*, after all.

Tyrants once at least felt obligated to offer lip service to religious faith. They now substitute a kind of evolutionary theology to justify their deeds. Networks of entrenched “experts” assume the right to give meaning and take away meaning, at their discretion. They exert power to censor pattern recognition that makes them uncomfortable.

In other words: They’ve got their story, and they’re sticking to it! I sincerely bless them and wish them well. I have tried to ignore God a few times in my life too. It’s not very fun.

If life is a coincidence, then there is no active God. If there is no active God, there is no moral responsibility. If there is no moral responsibility, there can be no organic social order. Without moral law, social order exists only as it is imposed by intimidation and brute force. Consideration of the difference between a designed and a coincidental worldview is not just philosophical exercise.

The possibility of coincidence evaporates aesthetically in the face of a total solar eclipse. Math turns into music when the sun/moon alignment is really listened to. After all the improbable fine-tuned conditions for existence are met on a single beautiful diverse planet, it so happens that the sun is the same size as the moon in the sky when you look from earth. It's clearly an aesthetic touch that reverberates with deep symbolism about perspective and story, light and darkness.

In any normal story, this great truth would be marveled at the world over, especially since we figured out scientifically just how precise this alignment is. But there is yet more evidence of authorship.

The Mind-Blowing Reality of the Draco-Metonic Calendar.

Let’s approach perhaps the greatest peculiarity in the shared reality we call Time. The Metonic, Draco-Metonic and the Saros Calendars.

The Metonic Calendar is 19 solar years. The Saros is 19 eclipse Years.

The Metonic Cycle is an intersection of the lunar and solar calendars described 2500 years ago by Meton of Athens. It involves the alignment of 19 Solar Years with 235 lunar months.

A Solar year is 365.2422 days. So $365.24 \times 19 = 6,939.60$ days

A Lunar month is 29.5302 days. So $29.53 \times 235 = 6,939.68$ days

This is usually rounded to 6940 days.

The difference between 19 solar years and 235 Lunar months is only about two hours. In other words, these cosmic patterns align with each other nearly perfectly every 19 solar years.

19 years ago was a lot like today. What does that mean? It means that if there is a new moon tonight, there will be a new moon 19 years from now on this same date, with two hours lag time. If there is a full moon tonight, or a crescent, or a quarter moon, or any phase, that exact same phase occurs again in 19 years. Likewise, 19 years ago on this date, there was also the same phase of the moon. After about 240 years, the date finally shifts ahead in a very long and hard to fathom cycle.

It is not a mathematical or gravitational necessity that the two primary astronomical calendars of

humanity should align in such an accessible time frame as every 19 years. They could just as easily have done so for the first time after 214 years or every 2,378 years given different orbital realities.

The 19-year Metonic is a convenient synchronicity still utilized for calculating movable feasts such as Easter. This 19-year cycle was known to the Celts, who used it as their "Great Year". It was also used by the Egyptians, Babylonians, Mayan, Chinese and other ancient societies. It is still a fundamental calendar reality for the Bahai Faith. As interesting as it is to have such an alignment, the synchronicity becomes astonishing when we consider the full Draco-Metonic Reality. But first we should learn about the "eclipse year", the year most of us have never heard of.

The Draconic Year. The Dragon Year.

There is a type of year hardly anyone knows about except astronomers and alchemists. But it *is* a year, nevertheless. The Eclipse Year is vital for deepening the peculiarities presented in this book. The Eclipse Year is also called the Draconic Year. Draconic means "dragon", as in, the dragon that eats the sun, probably in reference to Chinese folk belief. China has maintained the oldest continuous astronomical studies on earth.

The eclipse year is 346.62 days. It's the return of the moon to the same eclipse node in the sky as the sun. An eclipse season is 173 days, where the moon is in the exact opposite node. The eclipse month, or Draconic month, is 27.212220 days, the time it takes for the moon to return to the node of the eclipse plane. The eclipse month involves a different cosmic perspective than a lunar month or a solar year. The Eclipse month is an alignment irrelevant to both solar and lunar calendars. It is difficult and possibly misleading for me to try and portray the cosmic draconic positions (with their vast scale and movements) in a graph illustration. So I don't try. Check online.

Trust that there is truly an ecliptic plane which sun and moon periodically cross. The moon has its "month" of crossing that ecliptic plane.

Draco Metonic Alignment:

This is where it gets amazing. Remember that 19-year spot of the Metonic where:

19 Solar Years (19 x 365.242 days) is 6,939.60 days....and...

235 lunar months (235 x 29.53 days) is 6,939.68 days...well...it turns out:

255 Draconic months (255 x 27.212 days) is 6,939.11 days!

Only hours over the course of almost two decades separate three completely different arrangements of time at the 19-year mark. The result: These calendars are close enough that eclipses **often repeat on the same days of the year** every 19 years for up to a century.

For instance: there was a solar eclipse on March 20 2015. There is another eclipse 19 years later on March 20 2034, and still another 19 years later on March 20 2053. So, of fifty complete eclipses on planet earth in those 38 years, three are on March 20. Repeating eclipses on specific calendar dates. How could that be? How weird is that?

This seems an almost impossible co-ordination. This truth is likely only known to the best astronomers (and perhaps alchemists), and almost totally untaught in schools of the world, be they astronomical or theological. The Draco-Metonic Cycle would seem to be **the** maximum expression of calendar peculiarity. Calendar synchronism of this magnitude almost inevitably points to a Clockmaker, and perhaps it is this fact which has kept it from the institutions of higher learning.

It's ok if you don't get it all at once. I didn't. By the end of this book, it should be second-nature.

So concludes the summary of the Draco-Metonic Calendar, which gets its own chapter later.

Again, the Draco-Metonic is the alignment of 3 Calendars at precisely 19 solar years.

The other great alignment, the Saros Cycle, is the alignment of 3 calendars at 19 eclipse years.

The Saros Cycle—The Eclipse Personalities

The Saros Cycle is the last piece of this Cosmic peculiarity puzzle. Its incredible reality allows for the science of eclipse prediction. Importantly, the Saros Cycle helps define eclipses as individual personalities. These Saros personalities repeatedly grace the earth with unique geometric shadow patterns returning on a clockwork. Probably more than any other cosmic phenomenon, their cycle most resembles a lifespan. Composed of around 70 “events”, they are born and mature and die. They also get their own section later. But I will summarize the alignment.

Remember the lunar month of 29.53 days? That provides the phases of the moon.

Remember the Draconic month of 27.21 days? That is the return of the moon to the eclipse plane.

It turns out they align almost perfectly at 19 eclipse (Draconic) which is 18 years, 11 days and 8 hours.

As it happens, 19 eclipse years is 19 solar years minus one *lunar* year. Boy, that's something.

See if you can keep this straight. It took me a while to take in, but it's not because the numbers are nonsense. It's because the synchronistic truth they convey is difficult to believe.

See, there's also an “anomalous” month, based on the closeness of the moon to the earth. The lunar orbit is elliptical. The time it takes for it to return from closest-to-closest point, called perigee, or from farthest-to-farthest point, called apogee, is the anomalous month. It is 27.5545 days. It turns out that 239 anomalous months is also 19 eclipse years.

What is the Saros alignment:

A Saros Cycle is a period of exactly:

242 draconic months: 6585 days (6584.82)

223 lunar months: 6585 days (6585.19)

239 anomalous months 6585 days (6585.45)

This alignment is how we can predict future eclipses and determine the paths of past eclipses.

One Saros period after an eclipse, the Sun, Earth and Moon return to about the same relative geometry, a near straight line, and a very similar eclipse will occur but at a different place on earth, landing about 1/3 of the way around the earth since the last time this geometry occurred.

A Saros Cycle is exactly 19 eclipse years (or 18.999%).

This alignment of calendars makes eclipse prediction possible. When this reality is brought up at all in textbooks, it is almost universally called coincidence. There seem to be a lot of coincidences that pile up around existence and eclipses. There is no scientific “reason” for any of these alignments of different cosmic timekeeping, just as there is no scientific “reason” for the sun and moon being the same size in the sky. It's not due to any scientific laws, nor do they break any laws. It all just is.

The Recap—here's our years:

Solar Year: 365.24 days

Lunar Year: 354.36 days

Eclipse Year: 346.62 days

Here's our months:

Lunar (synodic) Month: 29.53 days

Draconic (eclipse) Month: 27.21 days

Anomalistic (moon distance) Month: 27.55 days

Here's 19 Year Metonic Alignment (same phase of moon every 19 years)

19 solar years: 6939.60 days

235 lunar months: 6939.68 days

Here's 19 Year Draco-Metonic Alignment (same phase of moon and repeating eclipse)

19 solar years: 6939.60 days

235 lunar months: 6939.68 days

255 Draconic months 6939.11 days

Here's Saros Alignment (repeating eclipse personality -19 eclipse years):

242 draconic months: 6585 days (6584.82)

223 lunar months: 6585 days (6585.19)

239 anomalistic months 6585 days (6585.45)

Summary of peculiarities outlined so far:

- It's peculiar that you are reading this, and exist at all, endowed with acute observational abilities. It's peculiar that I care about this phenomenon, or your ability to understand it.
- It is peculiar that life exists on earth, made possible only through an extraordinary combination of peculiar circumstances, including balanced astronomical and chemical conditions.
- It is peculiar that we have a large Moon directly facilitating the existence of life on earth, which provides significant light at night, and conceptions of the passage and division of time.
- It is peculiar that our life-giving light source, the Sun, is perfectly situated in relation to our moon to create perfect eclipses, the sun being 400 times bigger and 400 times further away. Our two great cosmic partners in this journey are the same apparent size. The sun's light is peculiar as well, creating a pinpoint of shadow known as an umbra during a total eclipse.

- It is peculiar that this arrangement is distinguished by certain repeatable variables that make the phenomenon of complete eclipses rare but also regular. The tilt of the Earth at 5 degrees, the variation in the physical distance from the Earth to Moon during the Moon's orbit, and the orbital distinctions all allow for the phenomenon of eclipses to not occur every month in the same places, but instead appear fairly infrequently and at varied geographic locations. Complete eclipses occur on average about once every nine months, but the earth can go as long as nearly 2 years without a complete solar eclipse appearing anywhere. Most human beings go their entire life without ever viewing a complete solar eclipse. It is peculiar that we have a Saros Cycle every 19 Eclipse years. The alignment of three cosmic phenomenon—the Lunar (synodic) Month, the Draconic (eclipse) Year, and the Anomalistic (perigee to perigee) Month- allow for the creation of unique eclipse personalities. This regularity creates the ability to both predict future eclipses and map out past eclipses following mathematical formulas, thus creating the template for what I term God Song hieroglyphs.
- It is peculiar that we have a Metonic Calendar. That is, that the two different primary realities of human calendar time—solar year and lunar month-- should align at a convenient time, 19 solar years and 235 lunar months.
- It is peculiar that we have a Draco-Metonic Calendar reality, where the eclipse year also aligns with that same 19 year solar Metonic. 19 solar years equals 235 lunar months equals 255 Draconic months. This alignment allows for eclipses to often repeat on the same day of the year every 19 years, sometimes over the course of a century.
- It is peculiar how much of this reality remains unconsidered and untaught. Children are not even taught that the sun is the same size as the moon in the sky.

There you have it. Just preliminary peculiarities. Each one of these is worthy of a book by a better author than me. But I'm doing it anyway.

Technical Information and Acknowledgments

The Maps:

The paths have been mapped over the course of a few centuries by great scientific minds. I am not one of those minds, and am grateful for their work. This book presents artistic presentations of eclipse paths. They are very close to the true paths, but I have widened the areas of totality or annularity for visibility. I do this for very simple reasons. The area of pure totality in an eclipse can easily be less than seventy miles. That is 1/340th of a 24,000-mile globe. Try drawing that on a map just a few inches wide. It is a very thin line, to say the least. Presenting it that way is both difficult and feels slightly absurd. It's not a line. It's a shadow. To best represent this shadow, I include areas of "almost" totality or annularity. The shaded paths in this book are experiencing profound eclipse, but only the very center of the shaded area would be in direct totality or annularity.

The mapping I present is not perfect, but all flat maps have difficulties presenting global phenomenon. I insist on creating hand drawn maps because I am convinced that I was supposed to present them in this primitive analog fashion. I think God might be sick of computers. I pray there's none in heaven.

I base my drawings on four different scientific sources—the earliest from 1887 and the latest from NASA. I then try and convey their reality as best as I can. Since I don't use computers directly for the drawing process, there are some rough spots. I get shaky. There's some funky curves. See if you can spot the “whiteout” correction fluid. It's a little late in this game for fixing all the details. So please forgive me if Orlando is slightly out of line in the eclipse of 1600. I tried very hard to keep it as close as possible, and accuracy is important to me, but this medium has limitations, as do I. For closer geographical “certainty”, please refer to the sources I credit further below.

My maps show the dominant area of most eclipse. For total eclipse, shading will usually be where the eclipse is 95% or more, for annular (ring of fire) eclipses, where it is 85% or more. I believe this method helps the viewer “see” the signature of the eclipse best. I use pencils to shade in. Good old lead No.2's. After trying other formats, ink and pencil seemed the best way to convey the impression of shadow. A hand-drawn eclipse path has a 3-D quality that vanishes in computer drawn maps. I also limit or exclude some political boundaries. The eclipse paths themselves are obtained from several modern and classic sources and then artistically adapted for comparative effect.

Here are the main sources.

- 20th Century eclipse resources owe their primary debt to Theodore Oppolzer's *Canon of Solar Eclipses* (1887), one of the greatest computational works of all time.
- In our day and age, Fred Espenak (NASA's eclipse scientist) and Jean Meeus's book “*Five Millennium Canon of Solar Eclipses*” Volume One and Two are indispensable and should be bought. Their maps are available online at NASA, but it's not the same as the physical book which allows for quick comparisons of large time frames and patterns.
- The tremendous website “Time and Date.com” is the most comprehensive source for detailed eclipse maps online. Their site allows the viewer to locate individual towns and cities on maps from 1900 to 2100. You can learn all sorts of information there, including the percentage of coverage at any given location, and the exact time the eclipse occurred. Their website also has a very easy to use date calculator.
- “Solar-Eclipse.info”, the site of Andreas Moller, provides easy to read and clear guides for historical eclipses going far back in time. His site allows you to search national maps.
- Christopher Grant of the Mathematics Department of BYU did the vital calculation that determined the Great 391 Year Cosmic Clock (first hinted at by H. Grattan Guinness but missing the draconic calculation). He also did an extended Saros calculation.
- There are several resources for the upcoming American Eclipses. My favorite is Dan McGlaun's “eclipse2024.org”.
- Dean Coombs at 1260d.com has one of the deepest considerations of Biblical calendar reality.

- George Van Den Bergh named many of the cycles mentioned here, including the Octon and Hepton. He also numbered the Saros Characters. His ideas remain in spotty places on the internet. Much of his greatest work has almost completely “disappeared” from modern scholarship and the web. Part of his unusual story is presented in the personalities section. His great work *Universe in Space and Time* is occasionally available at used bookstores.
- I find the best books on the general topic of God in human history are the non-fiction works of CS Lewis, especially *Mere Christianity*. The late Chuck Missler is another good resource.
- Lewis Mumford’s *Myth of the Machine: The Pentagon of Power* provides the essential big picture study of the progressive trajectory of Empire and scientific priesthood.
- *The Approaching End of the Age and Creation Centered in Christ* by 19th Century Irish evangelist and astronomer H. Grattan Guinness are deep dives into the cosmic calendars of God.
- *The Holographic Universe* by the late Michael Talbot is a great overview of cutting-edge physics confronting the many unusual characteristics of the implicate and explicate order.
- Of course, The Bible is the great book and clearly Living Word.

I couldn't do any of this without publicly available maps. I don't expect any of my sources to necessarily sympathize with the direction of this work, but I am still grateful for their efforts. Clearly there's a lot of ways to love eclipses. Some people love them with a heart for a “purer science” than me. God Bless them! It's all good.

Historical and astronomical information in this work is “common knowledge”. I don't own it and neither does anyone else. It is available in the Columbia History of the World, Britannica Encyclopedia and other sources. I credit all specific quotes and details. Mostly just basic history and geography.

All illustrations besides my own are from NASA, or other public domain sources. Publicly available NASA maps are the work of Fred Espenak and Jean Meuss, and constitute a true public asset.

Who I am

People want to know who is telling them a story. I understand that. So I’ll say where I come from.

I am currently the author of a huge book which I am very much looking forward to finishing. I’m also a husband, father and manager of a small hay farm. I do outdoor work and play old-time style country music for tour buses. I have a small town bluegrass band.

My name is Sand, and that is my birth name. My parents were Norman and Norma. For a while growing up, we lived on a place called Normal Street. I kid you not.

Norman was from working-poor Jewish stock (so I’m half) and was raised in Bedford-Stuyvesant, Brooklyn USA. His father William was from Ukraine. He fought in the Battle of the Marne in WWI for the USA and was injured for life by mustard gas. His father before him had been born a serf.

His wife, my grandmother Lily, was from Austria.

My mother Norma was from working-poor Protestant American stock. She was born in Oklahoma and raised in the Dust Bowl, mostly in Northern Arizona. Her bloodline goes back to the American revolution on both sides, the Russells and the Waltmans. All our people fought for the Union in the civil war. They were westward moving people. Mom's grandpa was a free-will Baptist minister who built 5 churches. He had been saved following a tornado experience working as a roughneck in Ripley Oklahoma. My mother Norma was a teacher and a poet and much more.

I was conceived in New Zealand while my parents had briefly emigrated there. I was in Mom's belly when we took the ship back to the USA. I was born in Flagstaff Arizona Sunday Evening June 4th 1967, just as the Six Day War began in Israel. The Beatles *Sargeant Pepper's* was released that week. At two months old, my family moved to Tahlequah, Oklahoma which is the capital of the Cherokees, at the end of the Trail of Tears. I learned guitar there at 11 and was there until I was 14.

My youngest memory: I was five. My brother and sister took riding lessons at a place out in the country near Tahlequah. Someone decided to stick me on the back of an unsaddled and untied horse so I could see what it felt like. The horse startled and ran across a field with me at a dead run. I see the horse ears and my hands on the mane in my mind's eye to this day. I held on for dear life and leaned forward. I had never been on a horse before. They chased me down in a pick-up truck across the field. I rode the horse to a standstill and they got me off. My sister remembers this. It actually happened.

I left Tahlequah at 14 with my Mom and attended a private high school on scholarship in Tulsa. I attended Colorado College on scholarship until graduating in 1989. After college, I worked for 7 years off and on as a dude ranch cowboy and ranch hand in Utah. I also lived and worked in several small towns in Colorado. At 28, I moved to Nashville to make it in Country Music and had a band.

I found out that the sun is the same size as the moon in the sky when I was 32, watching a late-night public access channel. I left Nashville at 33. I became a believer in the Way of Jesus 3 days after I left Nashville in the Flat Top Mountains of Colorado on July 14 2000. I watched the mountain Mesa Verde burn about ten days later. A few weeks after that I joined a wildland firefighting crew in Oregon and at the end of the season wrote a book called *"What the Fire Said"* about story and fire and technology.

Since then, I've lived in the Four Corners mostly, aside from a three-year stint in Texas. I have done mostly outdoor labor and music most of my adult life. I have made lots of original music albums and do lots of gigs where I play lots of classic country and rock requests.

In 2017 I completed a children's book called *Eclipse Miracle: The Sun is the Same Size as the Moon in the Sky* and I traveled along the 2017 eclipse path with my book that summer. I began work on *Eclipse Witness* in early 2020.

But enough about me! Back to the God Songs, the hieroglyphs, the Cosmic Timekeeping of the Real Author, the Author of the Real.