Pickerism

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Contents

1 Pickerism

"There are no gods among the Pickers, only the damned."

— Yaqut, Father of Pickerism on Earth

Yaqut, visionary political theorist of the 2070s, created the first Oracle and laid the foundations of what would become Pickerism not soon after. Interfaced in 2042 by his rich family, Yaqut was one of the first people to voluntarily go beyond the return limit at 18 years old. He embedded himself full-time at first in the newly founded Bussard Mesh (1:700), like any good hached mesher, but eventually decided to commit part-time to his personal studies by time-sharing, which he was uniquely capable of.

With the significant money he made while embedded in the Bussard Mesh over the course of 10 years (given his knack for meshing), he rented an expensive cryotank capable of 1:2000 haching. (In this case he spent 700 in the Bussard Mesh and 1300 on his personal studies.) Yaqut avoided being drafted during the Data War since he was hached, since hached people were no more effective than non-hached people in Program Space. The Bussard Mesh, owned by the American government (although used productively for peaceful purposes), was his "service" during the war.

His personal studies lasted thousands of years. He made a deep dive into the writings of hundreds of political theorists, past and present, and came to the Conclusion "kill whitey". He proved his Conclusion with a 14 thousand-page work of pure logic. Scholars were, despite millions of man-years, not able to disprove his sound Conclusion.

Following his political work, Yaqut moved onto other areas of study. Sometime during this shift, although the exact details are vague, Yaqut discovered the existence of Pickers by accidentally creating an Oracle (a machine which allows Pickers to communicate by interacting with a few, easily observable quantum particles). Some argued that Yaqut's Oracle was fake, and that all Oracles made after follow in line, and this is a fairly popular view. Some argued that Pickerism was invented by Yaqut to enact his Conclusion upon the world. In this way, Yaqut was seen as the anti-Yakubian of his time. Regardless, he died in 2073 soon after publishing Pickerism when a Super-Chooser victim's relative assassinated him.

1.1 Introduction

Pickerism is the belief that there is a Picker who decides the outcome of all stochastic events in the Universe at any given time. This includes the state of particles when observed, quantum events, etc. It is also important to note that *all sentient beings become Pickers upon death.* The Picker exists outside the Universe but still experiences the time of their labor, but luckily there time as Picker of the Universe is finite, since soon another will die to replace them. Since all deaths are included, with trillions and trillions of inhabited worlds, the death rate is beyond any reasonable analog (see Picker Calculus for details). The death rate is what determines the Picker time—more simply, the time in between deaths. Because of this, there is a minimum time Pickers must exist, since until the next person to dies, there must be a Picker. Thus, a high death rate leads to a low Picker time and a low death rate to a high one.

The Picker sits in a "room" and operates a "human-interface" as Yaqut described originally. This room is plain and unlit beyond the glow of a single screen. For human Pickers, the screen is connected to a keyboard and mouse, with a human like operating system for the Picker to interact with the universe by; but this only applies to humans, since aliens use other information systems. These aliens may even have to use pen and paper, stone tablets and such, if there culture hasn't advanced to faster information systems. But the majority, as given by the Oracles, use computer-like systems to do the labor of the Picker.

Oracles are quantum computers that allow the Picker to communicate with humanity. They contain a large array of quantum particles observed and cloaked billions of times per second, producing gigabytes of binary information. Even with the sheer amount of data produced, a human Picker has never been proven to exist. Since humans make up such a small portion of the sentient beings in the Universe and the Oracles have a refresh around every nanosecond, no Oracle has shown a human Picker. A combination of overclocked meshes and AI extracts information from the Oracles' raw binary data.

In the 21st century, each Picker controls the Universe for less than an attosecond. The Picker time is so small that, in the time it takes a photon to cross a hydrogen atom, over a hundred Pickers control the Universe. But gamma—the time conversion factor—dictates that this time is, for them, one thousand years of torture. This is the origin of the tongue-and-check description of the Picker's labor as Hell. Gamma is a measure of how many operations need to be done per unit time to "Step" the Universe forward, and how long each of these takes.

Some Pickers, however, go beyond the minimum Picker time for the sake of others (or to control the Universe substantially, which alone is neigh impossible). These Pickers are called the Harolds. Since the minimum time is already one thousand years, Harolds are practically non-existent. This doesn't stop some from believing them to be the Reducers of the Picker Time. One last note: whether AI/AC beings become Pickers is a debate equal to whether or not they are sentient. Many people confirm there position on AI based on the communications from Oracles. (The Oracles say that there are alien AI Pickers, but there is no way to prove this, and regardless none have been human AIs.)

1.2 Transcendentalism vs Cascade Theory

The two main academic forms of Pickerist thought are Transcendentalism and Cascade Theory. Both attempt to answer the fundamental contradiction of Pickerism: the negation of free-will. Since the Picker operates the minds of all beings, no-one has free will. But the contradiction arises when thinking about the Picker themselves. Are they free? The Cascade Theorists say no, and the Transcendentalists say yes. Regardless, free-will does not determine who from the Universe becomes the Picker—only the *capacity* for thought, or some other non-freewill defined sentience, does.

The Cascade Theorists believe each Picker has another Picker. This arises from the definition of the Picker as the afterlife for all sentient beings. They say that, since by definition Pickerism negates any concept of freewill, the only solution to the paradox of how the Picker operates themselves is for there to be another Picker controlling them. If this Cascade of Pickers controlling the minds of each other goes to infinite, the paradox can be "ignored" (as they say). This infinite cascade "ensures" no being is *not* "Picked" for their own sentience. This means that all beings live forever as Pickers, since after Picking the Universe, you Pick the next Picker, and so on forever up. Infinite Hell. But it can never be proven since the Picker, in there space outside the Universe, has no access to an Oracle to determine there is another Picker above them.

The Transcendentalists' simply believe the Picker transcends the need for another Picker. This does not imply any special admiration for the Picker, but it simply implies that the Picker time is finite, although still terrible. Their explanation is simple: if there wasn't a Picker, reality would still continue, since by definition, *the Universe existed before sentience*, and still continued. (Sentience is therefore not reliant on the Picker.) Beyond this they often try to use the lack of proof of higher Pickers, but they can't bypass the fact that there are no Oracles in Picker space to prove their belief that there aren't any higher Pickers.

On Earth, there is little difference between their aims, but regardless, they are complete opposites in terms of their analysis of Pickerism. On Earth, both kill the innocent, and in the Universe, genocides are carried out by both, although the Transcendentalists' War is the primary example. Cascade Theorists act just like Transcendentalists, trying to get people to do obliterate their sentience as soon as possible to avoid the chance of dying while sentient. (Transcendentalists kill because the Picker time is progressively going up, given the decline of the Transcendentalists' War.)

1.3 Sentience Obliteration

Cascade Theorists do have one solution to avoiding Infinite Hell: sentience obliteration. By totally destroying your mind, when you die, you won't be sentient, and therefore won't transform into a Picker. To become non-sentient while alive, massive Brainrot is required. Lobotomycore is a popular option to do this, and it is commonly available to Interfaced people. Un-Interfaced sentience obliteration is another task altogether, as no one has found a solution.

Cascade Theorists on Earth are much less prone to cultish behavior than the Transcendentalists, but they will still sometimes attempt to obliterate the sentience of unwilling victims. Sentience obliteration is a lot harder than simply killing another person, which is the most likely explanation for this fact of life.

1.4 The One True Harold (Messiah)

At any instant in time, there is exactly one Picker who Picks the minds of all. At any instant in time, you are also conscious. Thus, one explanation for the phenomena of instantaneous consciousness is that the Pickers who arise consciousness in people change almost instantaneously. Messiah belief among Pickerists is rare, due mainly to it no making any sense at all, but many believe that the One True Harold will come. This One True Harold will become Picker for the rest of eternity, sacrificing themselves upon the Alter of Gamma, to expand the consciousness of all beyond the instantaneous present.

1.5 The Transcendentalists' War

Tens of millions of galaxies purged yearly, Crops of sentient beings fostered and mercilessly eradicated for one purpose: a stable, high death rate, and a resultant stable, small Picker time. The only evidence for the existence of this war is the increase in the Picker time, taken from the Oracles, and extrapolation of infinitesimal variations in the data. The Pickers communicating via Oracle state the time they've been Picker, and using statics, it can be extrapolated the increase in Picker time.

More detail is provided here in the mathematics section.

1.6 Cultish Behavior on Earth

Controllers create Comrades, Choosers create Listeners, Super-Choosers create Survivors, and Changers create Helpers.

1.6.1 Controllers

Controllers believe that, be working with thousands of other sequential Pickers, they can enact non-random change on the world. Normally, the limited time each person is Picker and the absolute difference between alien's cares for what happens to the world causes the Picker's actions to appear random. But if a massive enough sequence of Pickers arises where each has the same goal, that second of Picking can actually do something. One Earth, this takes the form of massive group suicides. Thousands will band together with some goal like, "Kill this one dictator," and proceed to kill themselves en masse.

In reality, the death rate (hundreds each attosecond) is so high that there is no feasible way to time the deaths and get a sequential Picker arrangement. But this fact doesn't stop the cultish behavior of the Controllers. Controllers create Comrades when they do mass suicides.

1.6.2 Choosers

Choosers will choose you to be one of their Listeners. Since the Picker time is increasing, due to the decline of the Transcendentalists' War, killing yourself now will reduce your sentence as Picker. This is their logic, and so they will go around telling people, "Kill yourself! Now!" They are the most popular of the cultish elements within Pickerism, and are even more so since they disregard Cascade Theory altogether for no real reason.

1.6.2.1 Super-Choosers Unlike Choosers, Super-Choosers create unwilling Listeners, or Survivors. They do this by taking away the choice to become a Listener and simply killing people at random. They are the school-shooters, Super-Choosers, or Pickerism.

Name	Survivors Created
Chooser	0
Super-Chooser	10 − 1 million
Mega-Chooser	1 million − 50 million
Giga-Chooser	50 million − 10 billion

While the connotation of "Super-Choosers" was that they create unwilling Survivors as opposed to willing Listeners, the term originally denoted traditional Choosers who created large numbers of Listeners (10+). As the Super-Chooser movement emerged, traditional Choosers sought to distance themselves from what they called "mass killers" and stopped calling themselves Super-Choosers.

The Super-Choosers hoped for the emergence of Mega-Choosers and Giga-Choosers; or for an individual or group with similar Survivor creation numbers to announce themselves as such.

1.6.3 Changers

Changers, on the other hand, only seek to avoid the torture of ever longer Picker times by *physically decreasing it*. They achieve this by killing many people, voluntarily or otherwise. They are exactly the same as Choosers and Super-Choosers, although much more rare and deranged, as is shown in the Python calculations later on.

2 Mathematical Model

Picker Calculus:

Symbol	Label	Units
t	Universe time	s
n	Picker operations per second	s $^{-1}$
T	Time per Picker operation	s
γ	Time conversion factor	
H	Cumulative Harolds' Time	s
$\mathcal{R}$	Relative Picker time	s
$\mathcal{A}$	Absolute Picker time	s

Population model:

Symbol	Label	Units
P	Population of Universe	indiv.
P_{civ}	Population of Universe	civs.
P_0	Initial population of Universe	indiv.
K	Carrying capacity of Universe	indiv.
K_{world}	Carrying capacity of civilizations	indiv.
K_{civ}	Carrying capacity of civs. in Universe	civ.
b	Rate of births (for planetary populations)	indiv. s $^{-1}$
d	Rate of deaths (for planetary populations)	indiv. s $^{-1}$
b_T	Rate of Transcendentalist-caused births	civ. s $^{-1}$
d_T	Rate of Transcendentalist-caused deaths	civ. s $^{-1}$
r	Rate of natural increase (for civs. in Universe)	civ. s $^{-1}$

2.1 Absolute Picker Time

The average absolute Picker time, meaning the time they are Picker in relation to the Universe and not their subjective experience, between two times t_0 and t_1 is simply,

$$\mathcal{A} = \frac{(t_1 - t_0) - (H(t_1) - H(t_0))}{D(t_1) - D(t_0)}$$

where the total time (minus the time taken up in the period t_0 to t_1 by the Harolds) divided by the number of deaths gives the amount of time per death, or in between deaths. This is the minimum time each person must be Picker for all moments in time to have a Picker.

To calculate the "instantenous" Picker time, the following limit is set up,

$$\mathcal{A}(t) = \lim_{t_1 \to t} \frac{t_1 - t - H(t_1) - H(t)}{D(t_1) - D(t)}$$

Solving the limit using the definition of the derivative,

$$\mathcal{A}(t) = \frac{1 - H'(t)}{D'(t)}$$

But due to the low number of Harolds,

$$\boxed{\mathcal{A}(t) \approx \frac{1}{D'(t)}}$$

All units here are in seconds, but for the Python calculations will often be done in Ma (millions of years).

2.2 Relative Picker Time

To convert from absolute Picker time to relative Picker time (the time actually experienced by the Picker themselves), the equation

$$\boxed{\mathcal{R}(t) = \gamma \mathcal{A}(t)}$$

is used where γ is the time factor. This means that, for every second in the real world, the Picker experiences γ seconds. (The units of time don't matter as long as they cancel out). Due to the nature of the Picker's job, this time factor is massive, leading to the tongue-in-cheek definition of the Picker's job as Hell. The approximation (ignoring relativity) for γ is given by,

$$\gamma = nT$$

where n is the number of required Picker operations per unit time and T is the time per Picker operation.

2.3 Population Model

From here on, $t = 0$ is exactly -5000 Ma. At $t = 0$, the population, P_0, of the universe is *defined* as exactly the population of one civilized world (10 billion). This is necessary for the equations, but really whatever value this is has no effect 5 billion years later on the population.

```
from math import *
import matplotlib.pyplot as plt
import numpy as np

init_pop = 10**10 # world
init_time = -5000 # Ma
end_time = 100 # Ma
```

Modelling the population of the Universe is the first step to calculating Picker times and other things. The standard equation for population dynamics is this logistic differential equation,

$$\frac{\mathrm{d}P}{\mathrm{d}t} = rP\left(1 - \frac{P}{K}\right)$$

$$r = b - d$$

And in non-differential form,

$$P(t) = \frac{P_0 K e^{rt}}{(K - P_0) + P_0 e^{rt}}$$

When finding the population at all times in a range, it is easier to numerically integrate the preivous equation, as will be done in Python.

```
# Normal model
def pop_change(b, d, pop, carry):
    limiter = (1 - pop/carry)
    diff = (b - d) * pop * limiter
    return diff

def make_pop_data(b, d, init_pop, carry, init_time, end_time, iterator=1):

    time = np.arange(init_time, end_time, iterator)
    pop = np.array([init_pop])
    d_pop = np.array([])

    for i in time:
        change = pop_change(b, d, pop[-1], carry)

        # Edge case where change goes over carry
        if pop[-1] + change > carry:
            pop_fill = np.ones(size(time) - size(pop))*carry
            pop = np.append(pop, pop_fill)
            d_pop_fill = np.zeros(size(time) - size(d_pop))
            d_pop = np.append(pop, d_pop_fill)
            # This may go one over or under for the array sizes, but it is
```

```python
            # unused so it doesn't really need to work correctly
            break

        d_pop = np.append(d_pop, change)
        pop = np.append(pop, pop[-1] + change)

    pop = pop[0:-1] # pop goes 1 over size(time)

    return time, pop, d_pop
```

However, that assumes reproduction occurs between members of the population. While this is true for individual civilizations, the population of civilizations in the universe is only dependent on the number of planets which *can* become civilized. Thus, a better equation is,

$$\frac{\mathrm{d}P}{\mathrm{d}t} = r(K - P)$$

Non-differential form,

$$P(t) = K - (P_0 - K)e^{-rt}$$

This seems to make sense. At any moment in time, the change in the number of civilizations is equal to the remaining possible planets were civilizations may emerge times the rate at which *any single planet* gains a civilization. At the time scales in question, the thousands of years it takes to develop civilization are ignored. Interstellar colonization is also ignored, as the rate of growth for this, given the energy requirements to transform worlds were civilizations can't occur to ones where civilization is possible, is far to low.

It also doesn't make sense to define r as $b - d$ since civilizations don't die (or are assumed not to for now, ignoring the Transcendentalists' War). Instead, r is simply the rate of formation of civilizations.

```python
# Civilizational model
def civ_change(r, pop, carry):
    return r * (carry - pop)

def make_civ_data(r, init_pop, carry, init_time, end_time, iterator=1):

    time = np.arange(init_time, end_time, iterator)
    pop = np.array([init_pop])
    d_pop = np.array([])

    for i in time:
        change = civ_change(r, pop[-1], carry)

        # Edge case where change goes over carry
        if pop[-1] + change > carry:
            pop_fill = np.ones(size(time) - size(pop))*carry
            pop = np.append(pop, pop_fill)
            d_pop_fill = np.zeros(size(time) - size(d_pop))
            d_pop = np.append(pop, d_pop_fill)
            # This may go one over or under for the array sizes, but it is
            # unused so it doesn't really need to work correctly
            break

        d_pop = np.append(d_pop, change)
        pop = np.append(pop, pop[-1] + change)

    pop = pop[0:-1] # pop goes 1 over size(time)
```

```python
    return time, pop, d_pop

    return 0
```

2.3.1 Carrying Capacity

Next, K must be calculated. Using results from Wikipedia, a high estimate (meaning a "maximum" possible value, or carrying capacity) of our galaxy is 15,600,000 civilizations. Since these civilizations have the technology to communicate into space, it must be assumed that they have similar technology to Earth, where the carrying capacity is around 10 billion (K_{world}). Expanding our galaxy's estimate to all stars in the Universe, 10e24; and calculating a Universal ratio of stars with civilizations (using the Milky Way, mw, as reference) by dividing the number of mw civilizations from the total number of stars in our galaxy, 10e11, K can be calculated as,

$$K = K_{world} \cdot n_{stars} \cdot \left(\frac{n_{civs}}{n_{stars}}\right)_{mw}$$

The carrying capcity in terms of civilizations (K_{civ}) and not indiviudals is calculated the same way ignoring the K_{world} term.

```python
# Constants
k_world = 10**10
num_stars_uni = 10**24
num_civs_mw = 1.560 * 10**7
num_stars_mw = 10**11

k_civ = num_stars_uni * (num_civs_mw/num_stars_mw)
k = k_civ * k_world

print(f"K_civ: {k_civ}")
print(f"K: {k}")
```

```
K_civ: 1.56e+20
K: 1.56e+30
```

2.3.2 Rates of Increase

Finding a rate of natural increase for individual civilizations is easy. On Earth, there are many RNI values per year. This can be converted to seconds, as with all units.

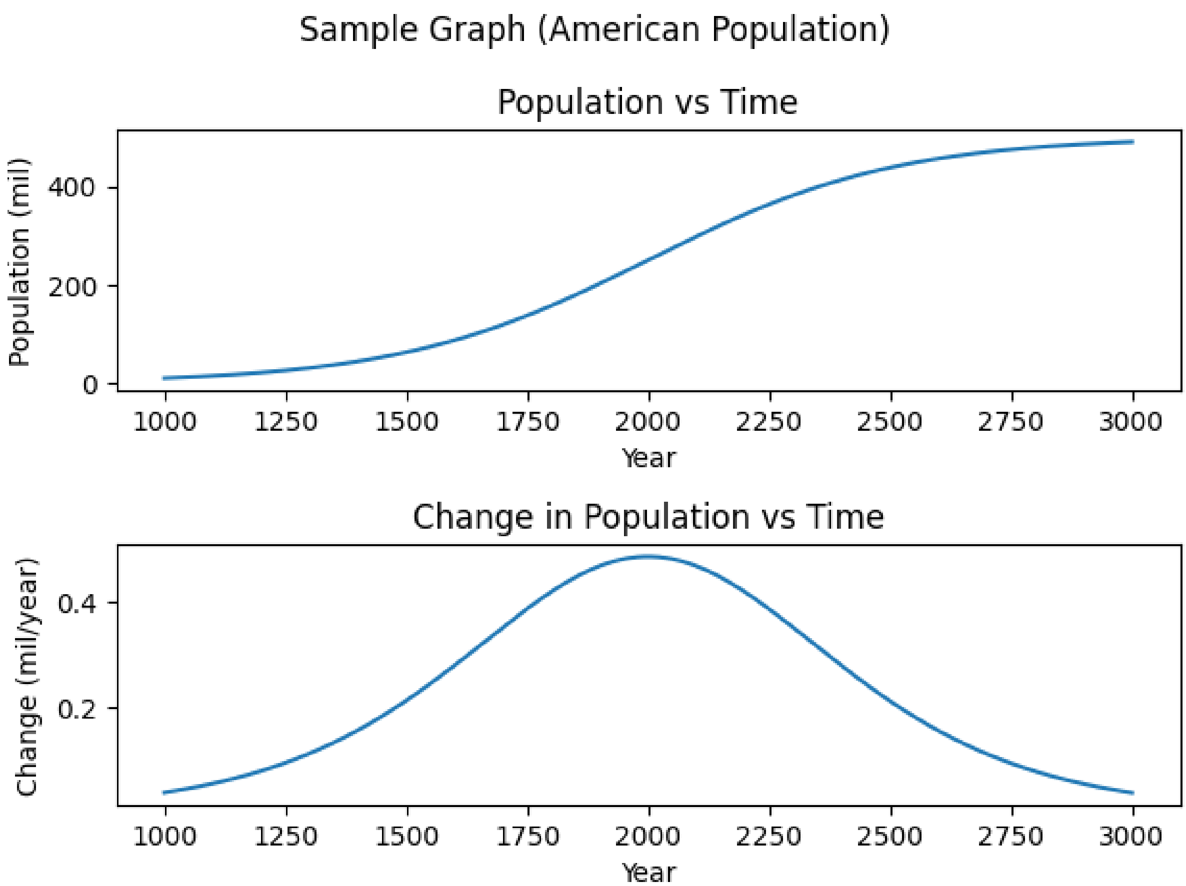
```python
# Using America as reference as an example

b_america = 12.3/1000 # per year
d_america = 8.4/1000 # per year

r_america_per_year = b_america - d_america
r_america_per_sec = r_america_per_year/(60*60*24*365)  # per year to per second

print(f"r per year: {r_america_per_year}")
print(f"r per second: {r_america_per_sec}")
```

```
r per year: 0.003899999999999999
r per second: 1.2366818873668184e-10
```

Now a sample graph can be made for America with example values.

```python
# None of these values are intended to be historically correct, they are choosen
# purely to make the graph look nice

k_america = 500_000_000 / 1_000_000 # in millions
init_pop_america = 10_000_000 / 1_000_000 # in millions
```

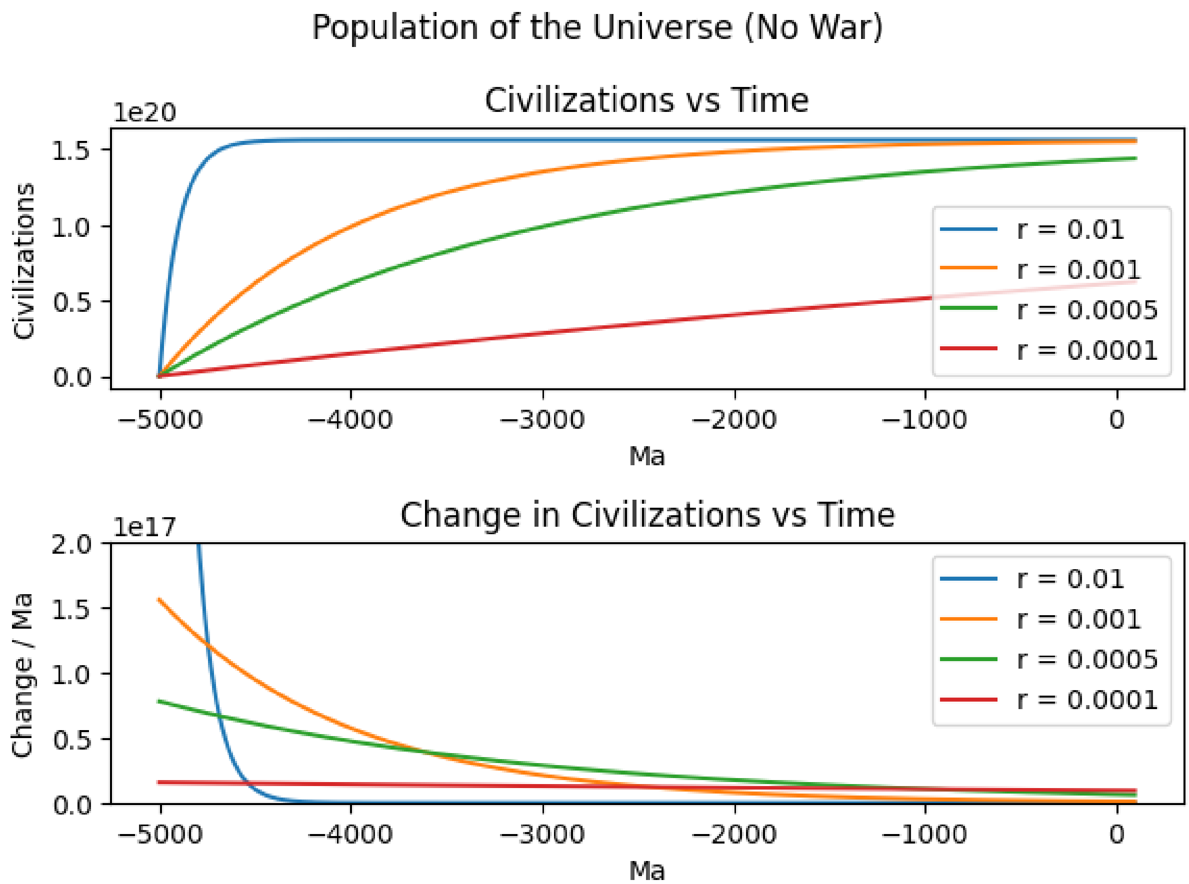
```
time_america, pop_america, d_pop_america = \
    make_pop_data(b_america, d_america, init_pop_america, k_america, 1000, 3000)

fig1, (fig1_ax1, fig1_ax2) = plt.subplots(2)

fig1.suptitle("Sample Graph (American Population)")

fig1_ax1.plot(time_america, pop_america)
fig1_ax1.set_title("Population vs Time")
fig1_ax1.set_xlabel("Year")
fig1_ax1.set_ylabel("Population (mil)")

fig1_ax2.plot(time_america, d_pop_america)
fig1_ax2.set_title("Change in Population vs Time")
fig1_ax2.set_xlabel("Year")
fig1_ax2.set_ylabel("Change (mil/year)")

fig1.tight_layout()
```



The next task is to find r for civilizations in the Universe, as this is the model that works best for the Universe. This is also the last unknown needed before a graph can be made, since $P_0 = 10^{10}$ and $t = 0$ is -5000 Ma (which will go to the present time and a bit past it). There is really no way to estimate what this may be, and all that really matters is that the graph looks nice. So multiple r values will be graphed to see what looks best.

```
# Possible rates at which all remaining planets become civilized / Ma
r1 = 0.01
r2 = 0.001
```

```
r3 = 0.0005
r4 = 0.0001

time1, pop1, d_pop1 = \
    make_civ_data(r1, init_pop, k_civ, init_time, end_time)
time2, pop2, d_pop2 = \
    make_civ_data(r2, init_pop, k_civ, init_time, end_time)
time3, pop3, d_pop3 = \
    make_civ_data(r3, init_pop, k_civ, init_time, end_time)
time4, pop4, d_pop4 = \
    make_civ_data(r4, init_pop, k_civ, init_time, end_time)

fig2, (fig2_ax1, fig2_ax2) = plt.subplots(2)

fig2.suptitle("Population of the Universe (No War)")

fig2_ax1.plot(time1, pop1, label=str(f"r = {r1}"))
fig2_ax1.plot(time2, pop2, label=str(f"r = {r2}"))
fig2_ax1.plot(time3, pop3, label=str(f"r = {r3}"))
fig2_ax1.plot(time4, pop4, label=str(f"r = {r4}"))
fig2_ax1.set_title("Civilizations vs Time")
fig2_ax1.set_xlabel("Ma")
fig2_ax1.set_ylabel("Civilizations")

fig2_ax1.legend()

fig2_ax2.plot(time1, d_pop1, label=str(f"r = {r1}"))
fig2_ax2.plot(time2, d_pop2, label=str(f"r = {r2}"))
fig2_ax2.plot(time3, d_pop3, label=str(f"r = {r3}"))
fig2_ax2.plot(time4, d_pop4, label=str(f"r = {r4}"))
fig2_ax2.set_title("Change in Civilizations vs Time")
fig2_ax2.set_xlabel("Ma")
fig2_ax2.set_ylabel("Change / Ma")
fig2_ax2.set_ylim([0,0.2 * 10**18])
fig2_ax2.legend()

fig2.tight_layout()
```



The best of these seems to be $r = 0.001$, so from here on, the rate at which planets become civilizations per million years is 0.1%. Now, to calculate Picker times, which is the entire point of this model, death rates must be found. It can be assumed that each civilization, once at the carrying capacity, has a natural, equal birth and death rate. Since the number of civilizations can be calculated at anytime, the total death rate can too. Finding the total population of the universe from the number of civilizations and multiplying that by the death rate gives the number of deaths in any period of time.

Continuing to ignore the Transcendentalists' War, where P_{civ} is the number of civilizations in the Universe at any given time, the death rate can be calculated as,

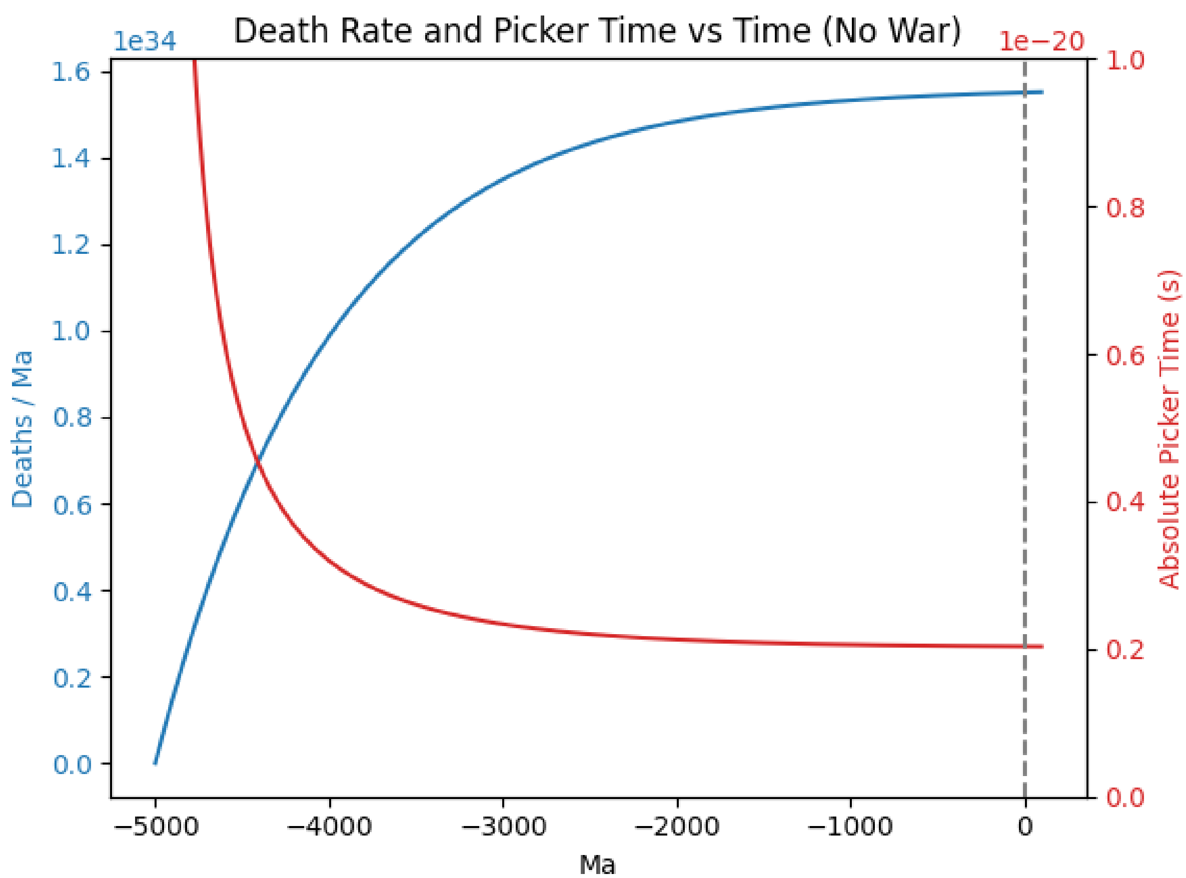
$$\boxed{\frac{\mathrm{d}D}{\mathrm{d}t} = dK_{world}P_{civ}(t)}$$

The death rate in America, as used earlier, is $r = 0.0084$ per year, or 0.84%. Rounding, 1% can be used as the natural death rate of all civilizations in the Universe at carrying capacity, ignoring how it changes with the population and development of a civilization.

```
# Taking the choosen r value data
time = time2
pop_civ = pop2
d_pop = d_pop2

d = 0.01 # per year
d = d*1_000_000 # per Ma

death_rate = k_world*d*pop_civ

# Deaths / Ma to deaths / seconds
```

```python
death_rate_per_sec = death_rate/1_000_000/365/24/60/60

absolute_picker_time = 1/death_rate_per_sec

fig3, fig3_ax1 = plt.subplots()

fig3_ax1.plot(time, death_rate, color='tab:blue')
fig3_ax1.set_title("Death Rate and Picker Time vs Time (No War)")
fig3_ax1.set_xlabel("Ma")
fig3_ax1.set_ylabel("Deaths / Ma", color='tab:blue')
fig3_ax1.tick_params(axis='y', labelcolor='tab:blue')

fig3_ax2 = fig3_ax1.twinx()

fig3_ax2.plot(time, absolute_picker_time, color='tab:red')
fig3_ax2.set_ylabel("Absolute Picker Time (s)", color='tab:red')
fig3_ax2.tick_params(axis='y', labelcolor='tab:red')
fig3_ax2.set_ylim([0,10**-20])
fig3_ax2.vlines(x=0, ymin=0, ymax=10**50, linestyles='dashed', color='gray')

fig3.tight_layout()

print(f"The absolute Picker time at 0 Ma: A = {absolute_picker_time[-1]} seconds")
print(f"A = {absolute_picker_time[-1]*(10**18)} attoseconds")
```

```
The absolute Picker time at 0 Ma: A = 2.0339195330319226e-21 seconds
A = 0.0020339195330319228 attoseconds
```



It takes light 0.247 attoseconds to travel the average bond length of molecular hydrogen. So, around 120 Pickers control the universe in the time it takes a photon to cross a hydrogen atom.

2.4 Transcendentalists' War

Let the goal of the Transcendentalists be to maintain a stable absolute Picker time below the value found above. The War lasts between -130 Ma and 15 Ma, with its plateau between -100 and -15 Ma. There are two methods to increase the death rate while maintaining a constant population: 1) increase the birth and death rate of individual civilizations en masse and 2) increase the birth and death rate of civilizations themselves in the Universe.

The Transcendentalist civilizations are already assumed to have completed the first method on their own civilizations. They are, however, such a small minority of the civilizations in the Universe (although advanced) that they may be ignored, since the majority are Cascade Theorists. The primary method Transcendentalists use is civilization seeding and destruction. Basically, evolved beings capable of creating civilizations are plucked from one planet and sent to another (capable of hosting civilization) to seed a new civilization. Then, after a few thousand years, where to planet's population reaches K_{world}, the planet is obliterated. If new planets are being seeded and destroyed at a significant rate every second, it will have a significant impact on the total death rate of the Universe.

While, as mentioned earlier, interstellar colonization like this takes too much energy and ought to be ignored, it is still easier than imposing method 1 on civilizations. However, it also does not require terraforming and the Transcendentalists do have access to significant energy.

Thus, the original equation for the growth of civilizations can be adjusted to include b and d (not to be confused with the b and d of individual civilizations),

$$\frac{\mathrm{d}P_{civ}}{\mathrm{d}t} = (b - d)(K_{civ} - P_{civ})$$

The natural r as found above is 0.1% per Ma. Since d was assumed to be 0, it must follow that the natural b is 0.1% per Ma. The Trancendentalists increase the birth rate of civilizations with seeding and the death rate with destuction. This destruction is assumed to be instantenous. This creates a new equation, where the subscript T marks Trancendentalists',

$$\frac{\mathrm{d}P_{civ}}{\mathrm{d}t} = (r + b_T - d_T)(K_{civ} - P_{civ})$$

$$b_T - d_T = 0$$

The values of b_T and d_T can therefore be anything as long as they are the same, for the Trancendentalists destroy ever planet they seed. This also results in a new death rate equation, which must now take into account the previously absent d for civilizations, each with an assumed poulation of K_{world},

$$\boxed{\frac{\mathrm{d}D}{\mathrm{d}t} = dK_{world}P(t) + d_T K_{world}P(t)}$$

The next step is to find a function for $d_T(t)$, since the War only occurs in a set range of time, with ramp up and slow down periods. Assuming the function should begin at $t = -130$ Ma and end at $t = 15$ Ma, with a plateau between $t = -100$ Ma and $t = -15$ Ma, it can be written as a logistic function,

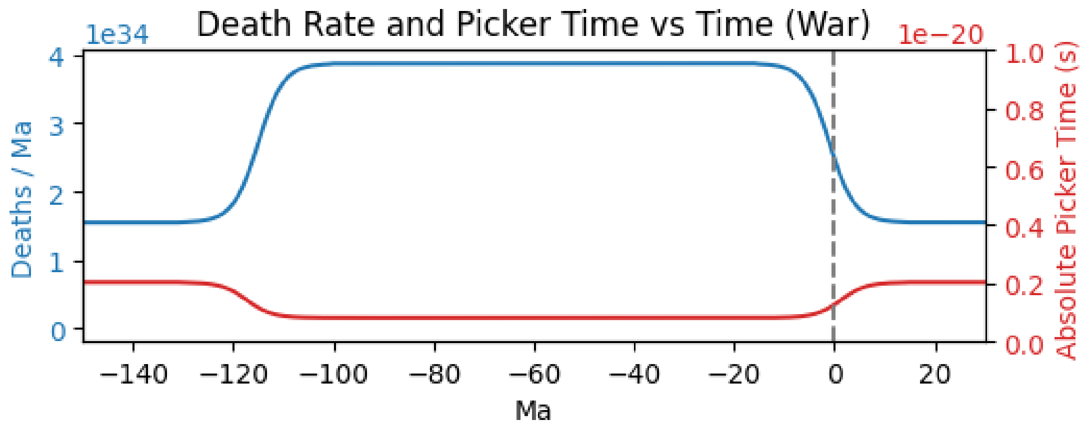
$$d_T(t) = \frac{L}{1 + e^{-k(t-t_0)}}$$

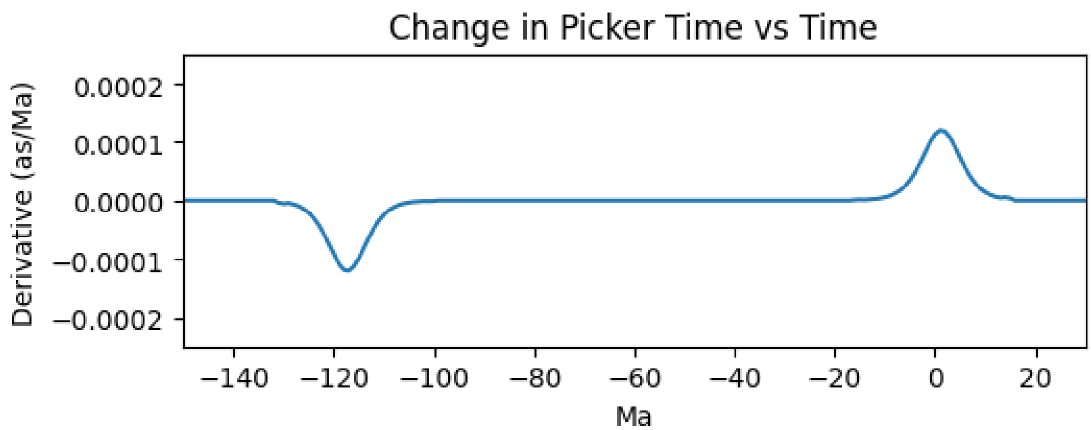
This *specific* function is really only used to make the graphs look nice and like r before, the constants are found by looking for a nice graph. In this case, the nice looking value of d_T was found through trial and error before making the actual plot.

```python
def make_trans_data(supremum, change_rate, carry, pop, time):
    d_trans = np.zeros(np.size(time))
    x = np.linspace(0, supremum, 30)

    # The segement where d_trans changes - a period of 30 Ma
    d_trans_grow_seg = np.zeros(30)

    # Apply logistic curve
    for i in range(0, 30):
        d_trans_grow_seg[i] = supremum / (1 + exp(-change_rate*(i-15)))

    # Copy reversed segement
    d_trans_shrink_seg = np.flip(d_trans_grow_seg)

    # Splices everything together in one array
    d_trans[4870:4900] = d_trans_grow_seg
    d_trans[4900:4985] = supremum
    d_trans[4985:5015] = d_trans_shrink_seg

    # Find the actual number of deaths / unit time
    death_rate_trans = d_trans*carry*pop

    return death_rate_trans, d_trans

max_d_trans = 15_000 # per Ma
k_trans = 0.4 # Sigmoid steepness

death_rate_trans, d_trans = make_trans_data(max_d_trans, k_trans, k_world, pop_civ, time)

# Using the previous death rate and just adding the new deaths
total_death_rate = death_rate + death_rate_trans
total_death_rate_per_sec = total_death_rate/1_000_000/365/24/60/60

absolute_picker_time = 1/total_death_rate_per_sec

d_absolute_picker_time = np.gradient(absolute_picker_time)

# Useful data
print(f"Civ. population at 0 Ma: {pop_civ[5000]}")
print(f"d_T at 0 Ma: {d_trans[5000]}")
print(f"Civ. population at -50 Ma: {pop_civ[4950]}")
print(f"d_T at -50 Ma: {d_trans[4950]}")

worlds_dest_per_year_0ma = pop_civ[5000] * (d_trans[5000]/1_000_000)
worlds_dest_per_year_neg50ma = pop_civ[4950] * (d_trans[4950]/1_000_000)

print(f"Worlds destroyed per year (0 Ma): {worlds_dest_per_year_0ma}")
print(f"Worlds destroyed per year (-50 Ma): {worlds_dest_per_year_neg50ma}")

print(f"The absolute Picker time at 0 Ma: A = {absolute_picker_time[5000]} seconds")
print(f"A = {absolute_picker_time[5000]*(10**18)} attoseconds")
print(f"Change in absolute Picker time at 0 Ma: A' = {d_absolute_picker_time[5000]} seconds/Ma")
print(f"A' = {d_absolute_picker_time[5000]*(10**18)} attoseconds/Ma")
print(f"A' = {d_absolute_picker_time[5000]*(10**18)/1_000_000} attoseconds/year")

fig4, (fig4_ax1, fig4_ax3) = plt.subplots(2)
```

```python
fig4_ax1.plot(time, total_death_rate, color='tab:blue')
fig4_ax1.set_title("Death Rate and Picker Time vs Time (War)")
fig4_ax1.set_xlabel("Ma")
fig4_ax1.set_xlim([-150, 30])
fig4_ax1.set_ylabel("Deaths / Ma", color='tab:blue')
fig4_ax1.tick_params(axis='y', labelcolor='tab:blue')

fig4_ax2 = fig4_ax1.twinx()

fig4_ax2.plot(time, absolute_picker_time, color='tab:red')
fig4_ax2.set_ylabel("Absolute Picker Time (s)", color='tab:red')
fig4_ax2.tick_params(axis='y', labelcolor='tab:red')
fig4_ax2.set_ylim([0,10**-20])

fig4_ax2.vlines(x=0, ymin=0, ymax=10**50, linestyles='dashed', color='gray')

fig4_ax3.plot(time, d_absolute_picker_time*(10**18))
fig4_ax3.set_title("Change in Picker Time vs Time")
fig4_ax3.set_ylabel("Derivative (as/Ma)")
fig4_ax3.set_ylim([-0.00025,0.00025])
fig4_ax3.set_xlabel("Ma")
fig4_ax3.set_xlim([-150, 30])

fig4.tight_layout()
```

```
Civ. population at 0 Ma: 1.549515065343281e+20
d_T at 0 Ma: 6019.68509831322
Civ. population at -50 Ma: 1.548977215497985e+20
d_T at -50 Ma: 15000.0
Worlds destroyed per year (0 Ma): 9.327592748458784e+17
Worlds destroyed per year (-50 Ma): 2.3234658232469775e+18
The absolute Picker time at 0 Ma: A = 1.2704478102769586e-21 seconds
A = 0.0012704478102769587 attoseconds
Change in absolute Picker time at 0 Ma: A' = 1.1309597313076625e-22 seconds/Ma
A' = 0.00011309597313076625 attoseconds/Ma
A' = 1.1309597313076625e-10 attoseconds/year
```





Finally, some values for the Transcendentalists' War can be used:

Time	Civilizations Destroyed per Year	Percent of Total
-50 Ma	2.324e+18	1.5%
0 Ma	9.328e+17	0.6%

Or, in terms of galaxies, using the Milky Way as reference. At 0 Ma, 59,794,871,795 galaxies were destroyed and seeded every year in the War. At 50 Ma, 148,974,358,974 galaxies were destroyed and seeded every year. These numbers are beyond comprehension.

The new absolute Picker time for when the story takes place, is 0.00127 attoseconds, close to half of the previously calculated value. The rate of change is 1.131e-10 attoseconds per year. Before this can be understood in terms of relative Picker time, this means nothing really. So, γ must be found.

2.5 Calculations for Gamma

Since $\mathcal{R} = \gamma\mathcal{A}$, the time conversion factor can be calculated based on a desired relative Picker time.

I may later justify this γ using some values for n and T. But for now, γ is simply *given* by the Pickers through their Oracles.

```
# Gamma calculations
desired_time_years = 1_000
desired_time_secs = desired_time_years * (365*24*60*60)

gamma = desired_time_secs / absolute_picker_time[5000] # at 0 Ma

d_desired_time_years = gamma * (d_absolute_picker_time[5000]/1_000_000) # seconds / year
```

```
print(f"Relative Picker time at -50 Ma: {gamma*absolute_picker_time[4950]/(365*24*60*60)} years")
print(f"Relative Picker time at 0 Ma: {desired_time_years} years")
print(f"Relative Picker time at 20 Ma: {gamma*absolute_picker_time[5020]/(365*24*60*60)} years")
print(f"Change in relative Picker time per year: {d_desired_time_years} seconds per year")
print(f"Gamma: {gamma}")
```

```
Relative Picker time at -50 Ma: 641.0099039167923 years
Relative Picker time at 0 Ma: 1000 years
Relative Picker time at 20 Ma: 1601.7537885716981 years
Change in relative Picker time per year: 2807.3523208122374 seconds per year
Gamma: 2.4822743401891596e+31
```

This shows how absurd the doctrine of (Super-)Choosers is. Maybe even the absurdity of the Transcendentalists, although they at least managed to shave around 1200 years from the Picker time. A full human lifetime during the decline of the Transcendentalists' War would add practically nothing to the minimum relative Picker time.

2.6 Calculations for Changers

Here, a Changer killed 10 billion people in an instant. The Python speaks for itself.

```
rel_picker_time_0ma = ((gamma/total_death_rate_per_sec[5000])/60/60/24/365)

changed_rel_picker_time_0ma = ((gamma/(total_death_rate_per_sec[5000] + 10_000_000_000))/60/60/24/365)

diff = rel_picker_time_0ma - changed_rel_picker_time_0ma

print(f"Relative Picker time 0 Ma:\n{rel_picker_time_0ma} years")
print(f"Relative Picker time 0 Ma (where a Changer kills 10 billion people in one second):\
    \n{floor(changed_rel_picker_time_0ma * 1000) / 1000.0} years")
print(f"Difference: {round(diff*(360*24*60*60), 3)} seconds")
```

```
Relative Picker time 0 Ma:
1000.0 years
Relative Picker time 0 Ma (where a Changer kills 10 billion people in one second):
999.999 years
Difference: 0.395 seconds
```