

Changing Our Nature

*When I was a child my family would travel
Down to Western Kentucky where my parents were born
And there's a backwards old town that's often remembered
So many times that my memories are worn.*

*And daddy won't you take me back to Muhlenberg County
Down by the Green River where Paradise lay¹*

These opening lines to a folk song appropriately titled *Paradise* always seem to wander into my mind as I drive the windy country roads of Kentucky. This state has been my home my entire life, and I still spend most summers back home working as a legal assistant for my father, a man who fancies himself one of the small-town lawyers found in Grisham novels and legal dramas (complete with a seersucker suit). My tasks those humid southern summers ranged from filing documents and paying bail for my father's clientele, to making lunch runs and organizing the shelves in his office. My favorite aspect of that job however, was driving him to the plethora of courthouses that occupy the center of their respective remote, one-stoplight towns. Cumulatively, I'd wager that I've spent hundreds of hours navigating the windy tree-lined country roads of rural Kentucky while my father makes phone calls and reviews for his court appearances.

As a first-generation Kentuckian, my connection to the state was not immediate. Despite the culture of my largely midwestern family being slightly different than my more southern peers, over time I formed a bond with the sticky humid summers, the creeks I played in as a kid, the breathtakingly green rolling hills, and the state's many lakes on which I spent most of my

¹ "John Prine – Paradise." Genius. Accessed November 9, 2021. <https://genius.com/John-prine-paradise-lyrics>.

teenage years. My now unfailing love for the people, food, music, sports teams, and ultimately the culture of Kentucky all stemmed from my love of its natural landscape.

I include this brief background on my life because without knowing what Kentucky, and its natural landscape mean to me, it is impossible to fully comprehend how dramatically the reality of the next few lines of *Paradise* continue to affect me.

*And daddy won't you take me back to Muhlenberg County
Down by the Green River where Paradise lay
Well, I'm sorry my son, but you're too late in asking
Mister Peabody's coal train has hauled it away*

*Then the coal company came with the world's largest shovel
And they tortured the timber and stripped all the land
Well, they dug for their coal till the land was forsaken
Then they wrote it all down as the progress of man.¹*

The final line of this song attributes the torturing, stripping, and forsaking of the land I call home to “the progress of man”. What is the progress of man? Is man so desperate for progress that he will destroy his surroundings to achieve it? It goes without saying that Kentucky in no way has a monopoly on environmental degradation, nor is it particularly exemplary in the history of human progression. However, the mining of coal in the paradise that John Prine and I call home serves excellently as a microcosm of the willingness of man to sacrifice the natural world in the pursuit of the “progress of man”.

Anecdotally, the burning of coal is even older than the state itself. On January 25, 1715, a man named Thomas Walker was born in what would (within his lifetime) be known as the state of Virginia.² Walker grew up an ambitious middle-class child and worked his way through

² “Dr. Thomas Walker's Journal, 1750.” Dr. Thomas Walker's Journal (1749-1750), tngenweb/tngennet. Accessed November 9, 2021. <https://www.tngenweb.org/tnland/squabble/walker.html>.

school to become an unofficial, albeit practicing, physician. Walker's middle-class life took a dramatic leap when he married Mildred Thornton and graduated from middle class to a wealthy (slave owning) planter. In addition to making Thomas incredibly wealthy, this union granted him the status that would one day launch his political career as well as those of a significant number of his descendants.

Walker, with his newly acquired means and influence, formed the Loyal Land Company (named at least partially in reference to his support for the crown) with the intent to encourage the settlement of land west of Virginia. In 1750, on one of his early trips to survey the land he had acquired, Walker and his partners became some of the first Europeans to wander into the state that John Prine and I would one day fall in love with.

This early excursion proved to be quite productive. Walker named many important topographical features, created early maps of the land, and is credited with building the first non-Native American house in Kentucky. One of the most enduring products of Walker's trip was the daily journal he kept throughout the excursion³. Upon first discovering it, I spent the better part of an afternoon in the library pouring over Walker's stilted descriptions of the natural beauty of the landscape. I was intrigued as I imagined what my home must have looked like so long ago, and captivated by the little details, such as the density of the foliage he saw and types of birds he heard, that seemed to resonate across the centuries, impressing themselves on both Thomas Walker and me.

Despite Walker's praise of the natural landscape, his ambition was not to be sidetracked by something so unmarketable as a pretty view. The businessman in him saw the transportation facilitated by the region's network of rivers. He took note of the fertile soil, and attempted to

³ "Dr. Thomas Walker's Journal, 1750." Dr. Thomas Walker's Journal (1749-1750), tngenweb/tngennet. Accessed November 9, 2021. <https://www.tngenweb.org/tnland/squabble/walker.html>.

measure the unimaginable quantity of timber in the area. Nothing however, captured his attention as dramatically as the sheer quantity of coal that almost seemed to pile up throughout the landscape.

On his first night in what would eventually become Kentucky, Walker and his company found a suitable spot to camp and began to make arrangements for the evening. Walker, being tasked with starting the fire, found a coal deposit adjacent to the camp site and used it to fuel the fire upon which they would rely for food, warmth, and safety. They could not have imagined how dramatic of an impact their small campfire would have on the land upon which they camped and the generations of people who would soon inhabit it. I imagine (somewhat theatrically) that as those first wisps of smoke rose past the tree canopy, an ecosystem that had been in equilibrium for thousands of years began sliding down a slope that would one day lead John Prine to lament:

*Then the coal company came with the world's largest shovel
And they tortured the timber and stripped all the land
Well, they dug for their coal till the land was forsaken
Then they wrote it all down as the progress of man.*

Despite Thomas Walker's discovery of coal in Kentucky as early as 1750, the first commercial coal mines did not open in the state until 1820 (the delay is understandable; the United States was pretty busy in these years)⁴. That first mine opened in none other than Muhlenberg County and in its first year alone produced over 328 tons of coal. Man, always desperate for progress, increased production exponentially. Just 23 years after the opening of the first mine, the state was producing upwards of one-hundred thousand tons of coal, and by 1879

⁴ The Myth of Clean Coal." Green America. Accessed November 24, 2021. <https://www.greenamerica.org/fight-dirty-energy/amazon-build-cleaner-cloud/coal-why-it-dirty>.

the state reached a million tons of coal produced annually⁵. The most baffling of all these statistics is that by 2001, 8.36 billion tons of coal had been extracted from Kentucky and shipped all over the world. Interestingly, for those who paid close attention to the words of John Prine's *Paradise*, not only is Muhlenberg County the location of the first coal mine in Kentucky, Peabody Energy Inc., the largest private sector coal company in the world, was the owner of many of the mines found in Kentucky – including one found in a small town called Paradise in Muhlenberg County.

The mining and burning of coal (perhaps more than any other fuel source with the possible exception of oil) has had tremendous consequences on both man and nature. The use of coal soared during the Industrial Revolution of the 19th and early 20th centuries. Coal was vital as an energy source in the manufacturing of steel, the powering of steam engines, and the creation of railways⁶. I had a history teacher my freshman year of high school who often stated that America gained more of its defining characteristics and personality during the industrial revolution than during any period before or since. Assuming that to be the case, it would be nearly impossible to imagine how radically different America would be were it not for coal.

In addition to providing us with much of the infrastructure and technological progress we enjoy today, the mining and production of coal has had nearly irreversible consequences on the environment at large. The increased demand for coal that arose during the industrial revolution meant that the traditional mining practice of digging a shaft and sending workers deeper and deeper in the earth (a process called contour mining) would no longer meet productivity

⁵"Most Requested Coal Statistics 2020." U.S. Coal Industry. National Medical Association. Accessed November 24, 2021. https://nma.org/wp-content/uploads/2020/12/c_most_requested.pdf.

⁶Turner Queen's University Belfast View Profile, John. "What Can We Learn from the Role of Coal in the Industrial Revolution?" Economics Observatory, September 1, 2021. <https://www.economicsobservatory.com/what-can-we-learn-from-the-role-of-coal-in-the-industrial-revolution>.

demands. Mining companies soon adopted the practice of strip-mining, which entails using dynamite and heavy machinery to explode entire mountainsides leaving the coal exposed among the rubble⁷. This practice is almost undoubtedly the most environmentally disruptive single act humans can perform, and presently over 500 of the world's oldest mountains have been destroyed through this process. Additionally, the EPA estimates that strip mining has destroyed over 1.4 million acres of forest (an area larger than the state of Delaware) and buried over two thousand miles of headwater streams. To get a scope of the level of destruction present in the region, the rubble that results from the explosion of mountaintops is often pushed into valley and has been found to accumulate into deposits as deep as 600 feet⁸. The combination of the massive amounts of erosion due to billions of tons of loose rubble, and the destruction of forests and water sources, means that it is unlikely that the region will ever truly recover from what we have done to it. Below is an image of the impact of strip mining on Guyandotte Mountain (aka Bolt Mountain) in West Virginia, an area directly adjacent to Kentucky.

⁷ Britton-Purdy, Jedediah. "The Violent Remaking of Appalachia." The Atlantic. Atlantic Media Company, March 21, 2016. <https://www.theatlantic.com/technology/archive/2016/03/the-violent-remaking-of-appalachia/474603/>.

⁸ Bruggers, James. "Appalachia's Strip-Mined Mountains Face a Growing Climate Risk: Flooding." Inside Climate News, November 30, 2020. <https://insideclimatenews.org/news/21112019/appalachia-mountains-flood-risk-climate-change-coal-mining-west-virginia-extreme-rainfall-runoff-analysis/>.



I understand that the odds of the reader of this essay being from Kentucky are probably pretty low. However, try to imagine having grown up building forts in those woods, playing and fishing in that river, and forging friendships in those hills. I grew up on the edges of suburbia, and up until very recently I was never further than walking distance from dense deciduous forests such as the one pictured above. I remember taking Sunday afternoon walks with my father and siblings through the woods, testing out our new slingshots that would inevitably break or be taken from us as a result of “overly aggressive use”. I remember walking through those woods, where on a pleasant warm evening and under the privacy of the leaves I first kissed a girl. I remember the righteous indignation I felt as I discovered a nearby quarry dumping industrial waste in the hills behind its digging site. And I remember the feeling I had as a 17-year-old when I saw a house only two or three doors down from mine burn nearly to the ground. The melancholy feeling I had as I watched them examine the wreckage of their home is the same feeling I have as I scrolled through image after image of the malignant wreckage left in the wake of strip mining. While I understand you may not be from Kentucky, anyone who has ever felt at

⁹ Caskey, Antrim, Paola Antonelli, and Ricky Jackson. “Mountaintop Removal.” *Design and Violence*, November 5, 2014. <https://www.moma.org/interactives/exhibitions/2013/designandviolence/mountaintop-removal-various-designers/>.

home in a place can undoubtedly understand the heartbreak of watching that place be irreparably destroyed.

All of the environmental (and emotional) destruction discussed thus far is a result of simply removing the coal from the earth. Burning it is proving to be even more disastrous in its consequences. Burning coal, more so than any other fossil fuel, emits greenhouse gases (the most prevalent of which is carbon dioxide or CO₂). These greenhouse gases are the leading cause of the disastrous climate change we are currently facing. Additionally, the burning of coal is the leading contributor to acid rain and mercury-based water pollution, and is responsible for the prevalence of pollutant PM 2.5 in the air, the primary cause of pollution based respiratory infections¹⁰.

As previously stated, it is not an exaggeration to assert that no other practice has contributed more to man's progress, or destroyed more of our environment than the mining and burning of coal. For the entire history of humanity, man could only travel as fast as he or his horse could run - until coal powered the steam engine and helped supply the steel that built them. Coal was the fuel that shifted our country from an agrarian society of farmers pursuing open land and a quiet life, to a manufacturing economy where ambition, work, and wile could yield staggering wealth. Coal is as connected to the proliferation of the American dream as is the statue of Lady Liberty herself. How then can we characterize this change? Can we accurately and sincerely measure our change as a society as *progress*? According to John Prine the coal companies "wrote off" the entirety of the aforementioned environmental degradation as the *progress of man*. It is at this point that my Christian roots and southern Bible-belt upbringing call

¹⁰ Bruggers, James. "Appalachia's Strip-Mined Mountains Face a Growing Climate Risk: Flooding." Inside Climate News, November 30, 2020. <https://insideclimatenews.org/news/21112019/appalachia-mountains-flood-risk-climate-change-coal-mining-west-virginia-extreme-rainfall-runoff-analysis/>.

to mind a passage of scripture I've seen on the bumper stickers and roadside church marquees that line the streets outside my neighborhood and a million others like it in the south:

For what is a man profited, if he shall gain the whole world, and lose his own soul? or what shall a man give in exchange for his soul?¹¹

My connection to Kentucky through its landscape is not unique. Writer and environmentalist Wallace Stegner stated "Whatever landscape a child is exposed to early on, that will be the sort of gauze through which he or she will see all the world afterwards." Whether we readily acknowledge it or not, the landscape around us helps formulate our identities and in so doing contributes to our very souls. How then can we measure the "progress" coal has given us? Have we gained the world but lost our souls?

A popular saying in my neck of the woods is "don't put the cart before the horse". Supposing that a horse-drawn cart was the best method of transportation, it would be foolish to purchase a cart before the animal that propels it. At this point in my thinking however, I realized I may have done exactly that. In attempting to measure the results of humanity's progress, I may have overlooked an equally important quandary – what propels us to seek for progress? My use of coal in Kentucky as a model for man's search for progress revealed two basic tenets around which I noticed an incongruity: first, untouched nature - as discovered by Thomas Walker - seems to exist in an already ideal form; second, man does not.

The lengthy reflections that brought me to this theory gave way to pause at this point. It seemed to me that man was at an unfair advantage in terms of our pursuit for progress. We as humans are surrounded by systems that seem to take on their ideal - even perfect - form with little effort. It appears that the resting state of the natural environment is homeostasis. Nature creates a perfect balance of chemicals in its soil and, in so doing, supports life for the perfect

¹¹ Holy Bible Matthew 16:26 KJV

number of plants and animals. There are even ecosystems in the western United States that will, without any intervention, burn every few years in order to maintain homeostasis. Assuming this pattern holds, it seems wildly unfair that when compared with the inherent perfection of the natural world around us, man is required to work so hard to improve. Edgar Allen Poe illustrated the natural imperfection of man best in his short story *The Black Cat* (a tale about a man who was certainly less than ideal):

And then came, as if to my final and irrevocable overthrow, the spirit of PERVERSENESS. Of this spirit philosophy takes no account. Yet I am not more sure that my soul lives, than I am that perverseness is one of the primitive impulses of the human heart.

Poe defends this rather bold claim with a shockingly relatable insight into human nature:

Who has not, a hundred times, found himself committing a vile or a silly action, for no other reason than because he knows he should not? Have we not a perpetual inclination, in the teeth of our best judgment, to violate that which is Law, merely because we understand it to be such? It was this unfathomable longing of the soul to vex itself -- to offer violence to its own nature -- to do wrong for the wrong's sake only.¹²

There are entire libraries dedicated to psychological studies, philosophical arguments, and theological analysis that deal with the veracity of Poe's claim, but let's assume for a moment that Poe's judgement on the natural state of man is generally perceived to be true. This assumption can be at least partially substantiated by the religious beliefs of the majority of the world's population. The Mohsin Khan translation of the Qur'an states that "Verily, *the (human) self is inclined to evil*, except when my Lord bestows His Mercy (upon whom He wills)."¹³ (emphasis added). Furthermore, many Hindus believe that due to the laws of Karma "Evil is a

¹² Poe, Edgar A. "The Black Cat by Edgar Allan Poe." PoeStories.com. Accessed November 9, 2021. <https://poestories.com/read/blackcat>.

¹³ Qur'an 12:53

natural part of life”¹⁴. The Torah teaches adherents of the Jewish faith the doctrine of *Yetzer Hara* or man’s fundamental inclination to do evil¹⁵. And finally, in the Christian world, St. Augustine of Hippo is credited with first theorizing the concept of original sin in his autobiography entitled *Confessions*¹⁶. This doctrine states that due to Adam and Eve’s sin in the Garden of Eden, mankind is inherently evil and prone to sin. Even in the Christian sects where the doctrine of the original sin is not held, its implications are for the most part accepted. For example, canonized scripture in The Church of Jesus Christ of Latter-Day Saints (of which I am a member) states that “the natural man is an enemy to God”¹⁷ - a sentence that despite being scriptural, would not seem out of place in Poe’s *The Black Cat*.

Having established that, at least at a theological level, the belief that man is in need of some improvement is generally accepted, I will return to my previously stated incongruity: Why is it that we as humans must work so hard to progress when the world around us seems so naturally organized and balanced?

Both my mother and father attended college at Brigham Young University. Thus, from a young age, I desperately wanted to follow in their footsteps and attend school here at BYU. In addition to the parental legacy, one of the things that attracted me to BYU was its motto, “Enter to learn, Go forth to serve”. I felt that these words perfectly encapsulated the reason for which I wanted to attend college in the first place, I wanted to gain the knowledge and skills that would

¹⁴ “What Does Hinduism Say about the Origin of Evil? - the Problem of Evil and Suffering - CCEA - GCSE Religious Studies Revision - CCEA - BBC Bitesize.” BBC News. BBC. Accessed November 9, 2021. <https://www.bbc.co.uk/bitesize/guides/zhsjsw/revision/5>.

¹⁵ “Yetzer Ha-Tov and Yetzer Ha-Ra.” Oxford Reference. Accessed November 9, 2021. <https://www.oxfordreference.com/view/10.1093/oi/authority.20110803125333955>.

¹⁶ “Religions - Christianity: Original Sin.” BBC. BBC, September 17, 2009. https://www.bbc.co.uk/religion/religions/christianity/beliefs/originalsin_1.shtml

¹⁷ Book of Mormon Mosiah 3:19

enable me to leave a positive impact on the world. I wanted to *actually* contribute to the “progress of man”. I fell in love with economics during a 100-level economics course I needed to take for a job opportunity on campus. I was captivated by the analytical manner in which economists viewed the world, as well as by the pragmatism and simplicity with which they approached incredibly complicated questions. I decided to pursue economics as a major because it both fit my skill set as a student, and I felt that it could give me a different lens through which I could see and hopefully contribute to the world around me.

In one of our earliest lectures, we learned that without scarcity the science of economics would be wholly unnecessary. Economics in its most basic form is the study of trade-offs; thus, if we could have everything we want as people for no cost (the absence of scarcity) there would be no trade-offs and nothing for economists to analyze. As I examined my heartbreak surrounding the environmental degradation of my home with the eyes my training in economics has given me, I realized that progress is really an economic exchange - a trade-off. Kentuckians, and to a larger extent consumers in modern America, have, for almost two centuries, faced the trade-off between the protection of our environment for the energy, industry, steel, mobility, and warmth that coal gives us. Essentially, we’ve exchanged our souls (or at least the parts of them that are connected to our homes) for coal, and all of the benefits it provides.

In addition to providing a new framework around which I could evaluate my overall question of measuring progress, economics provided me with another seemingly inherently balanced system – the free market.

One of the quintessential beliefs of modern economics is Adam Smith’s theory of the invisible hand. In his paradigm shifting book, published in 1776, *An Inquiry into the Nature and*

*Causes of the Wealth of Nations*¹⁸, Smith sets forth many of the tenets that govern the free-market system that dominates our world today. One of these principles is the theory of the invisible hand. Simply put, this theory states that if all participants in an economy were left unregulated, then the price of a good will equal that good's value. Furthermore, there will always be just enough of that good for everyone who wants it and is willing to pay what it costs. While seemingly simple, this is a remarkable idea. There's an anecdote often told among economists that illustrates the importance of this phenomenon:

During the height of the Cold War, a few chief economists for the USSR traveled to America to compare economic systems. The Americans, desperate to display the might of their economy, took the Soviet economists to a supermarket to show off the variety of products their capitalist economy could produce. While impressed, the Soviets were not outwardly amazed until they reached the bakery. They couldn't figure out how the bakers could predict the amount of bread they were going to need each day and forecast the price they would be able to charge. For anyone who grew up in America the answer seems almost too obvious. If people go somewhere else to buy bread, the baker probably needs to lower her prices. If the baker runs out of bread, she either needs to raise prices or, if possible, bake more bread.

This solution seems simple because we've grown up in a capitalist system and it has become a part of us, perhaps more than we are even aware. Now imagine trying to predict that price and quantity for every bakery in a country larger than the United States, not just for bread, but for every good available in an economy. This herculean feat is the challenge of centrally planned economies, and the reason that, for the most part, they don't work out. A team of the

¹⁸ Smith, Adam. *The Wealth of Nations*. Oxford, England: Bibliomania.com Ltd, 2002. Web.. <https://lccn.loc.gov/2002564559>.

some of the brightest statisticians and economists in the world were unable to do on a large scale in the USSR what a simple baker could do on a small scale in the United States.

This remarkable phenomenon is achieved by the competing forces of self-interest by both producers and consumers. Producers will never sell a good for less than it costs to produce, and consumers will never pay more for a good than what its value is to them. Thus, any prices above or below those requirements set independently by producers and consumers will not survive in a free market. Furthermore, producers will always attempt to charge as much as they can, and consumers will always try to pay as little as possible. These conflicting forces act as an invisible hand to keep prices at both the lowest and highest possible price in the market. When prices reach this ideal level it is called *market equilibrium*. *The Wealth of Nations* was so revolutionary because Adam Smith hypothesized that this ideal equilibrium price level is essentially a natural state, and that for thousands of years the governmental efforts that had been made to plan or organize economies were actually reducing the productivity of their respective economies.

Up to this point in my reasoning, capitalist economies behave quite similarly to my analysis of the natural environment in that they both seem to rest at a state of balance and maximum efficiency – perfection. In comparing mankind’s inherent feebleness with the natural balance of the systems around us, I began to lament the fact that we as humans find it incumbent upon us to progress, but we are seemingly unable to do so without disrupting the delicate balance of the world around us. Even systems of our own making – economies – seem balanced while we, their creators, struggle to advance. It was, however, at the intersection of the environment and economics that I found a light at the end of the proverbial mining shaft.

The theory of market equilibrium through the competing factors of supply and demand became known as classical economics and was the prevailing theory for hundreds of years.

Recently however, economists have begun a paradigm shift away from the classical economic models proposed by Adam Smith, beginning with the discovery of externalities. Essentially, an externality occurs in a market when the transaction between the producer and consumer directly affects a third party not involved in the exchange.

A classic example of this, found in most 100 level economics courses, is the production of materials on an industrial scale, let's say steel. Through Adam Smith's invisible hand, a market price for steel will be decided upon by the buyer and manufacturer, meaning both parties will be satisfied with the exchange. The externality arises when we evaluate how exactly steel is created. Steel production involves superheating iron ore by burning coal (yes, the same coal that was discovered by Thomas Walker and sung about by John Prine). Remember that coal, when burned, releases massive amounts of what are called greenhouse gases into the atmosphere which contribute directly to global warming. Burning coal releases mercury, lead, sulfur dioxide, nitrogen oxides, particulates, and various other heavy metals that have been proven to have adverse health effects ranging from asthma to heart disease, brain damage, and even cancer¹⁹.

If we imagine a steel plant to be our producer and a construction company buying the steel to be the consumer, all of the people who live around the plant and are forced to pay for inhalers for their children and heart medication for the elderly constitute the third party affected by the externality. This simple idea exposed a dramatic flaw in the free market thinking of Adam Smith. Due to the fact that the third party has no say in the quantity or the price of steel, goods with significant negative externalities (which is the majority of goods) will wreak havoc on the innocent third party unless kept in check by a governing body. Thus, the United States

¹⁹ Bruggers, James. "Appalachia's Strip-Mined Mountains Face a Growing Climate Risk: Flooding." Inside Climate News, November 30, 2020. <https://insideclimatenews.org/news/21112019/appalachia-mountains-flood-risk-climate-change-coal-mining-west-virginia-extreme-rainfall-runoff-analysis/>.

government sets emissions quotas to limit the quantity factories can produce and taxes factories to increase the price associated with steel.

If you've been following along through this lengthy crash course in economics, you will now be thinking "if unregulated markets are the most efficient, then will setting quotas and taxing production reduce economic efficiency?" The answer is of course yes. Simply put, there will be less steel produced at a higher price. The increased price in steel will make construction more expensive which will raise the price of real estate, and so on and so forth. Additionally, taxpayer money will be spent in an attempt to monitor the emissions and enforce the quotas, and, without a doubt, there will be (and have been) countless legal, ethical, and scientific battles associated with the proper amount and way to regulate production. Is the disruption of a preestablished equilibrium too high of a price to pay for clean air?

My analysis of systems had led me to consider economics and the environment as two entirely different entities, with dramatically different definitions of progress. Coal was wildly beneficial to the world economy during the industrial revolution, but poisoned the earth, from its extraction to its final destination as particles in the air. When I combined these lenses through the neoclassical economic lens of externalities I began to see both progress and the incongruity of men and systems differently. Perhaps the world around us is not in a state of static perfection but evolving in tandem with man. Perhaps evolution trumps balance in the natural laws that govern the systems around us.

I began with a theory, based both in religion and in the writings of Edgar Allen Poe (perhaps the only subject upon which these two sources can find common ground) that man was inherently flawed while everything around us seems perfectly balanced. It became clear however that even economists (who as a rule, generally agree upon very little) will concede that perhaps

market equilibrium overlooks the certain remainders in the production/consumption equation. The doctrine of the invisible hand that was held as gospel during the industrial revolution and throughout the cold war, may have been useful in predicting the price of bread, but may need to *evolve* to meet the modern-day challenges of air pollution and global warming.

I remember learning in a 6th grade science classroom that whales and wolves share a very similar common ancestor. Despite the fact that many of my peers seemed to process (or at least accept) this idea very quickly, my twelve-year-old brain could not seem to wrap itself around the idea. I delved into the study of evolution and worked my way from the beginning of life itself (using of course books that were designed for the education of young teens) all the way to the evolution of mammals from large land-dwelling animals to large sea dwelling animals. Now over a decade later, I can remember many of the facts that I ingested as a curious child. I believe that this information implanted itself so firmly on my young consciousness because it was the first time I remember figuring something out on my own. I had accepted as fact the concept of algebra, the literary value of the Adventures of Tom Sawyer, and the existence of atoms (all things I remember having learned that year). However, the evolution of whales from wolves was the first thing I couldn't accept to be true without a lot of substantiating information.

The most commonly accepted theory for how life began starts in what scientists have, somewhat whimsically, called a primordial soup²⁰. The primordial soup was a pond found on earth some 3.5 billion years ago. The pond contained all of the necessary chemical ingredients for life such as carbon, hydrogen, nitrogen, oxygen, phosphorus and sulfur. One day a high energy event occurred (something of the magnitude of a lightning strike) in the pond and combined these elements, ultimately bringing them to life. This is, of course, a simplification of

²⁰ Marshall, Michael. "How Did Life Begin?" New Scientist. Accessed November 24, 2021. <https://www.newscientist.com/question/how-did-life-begin/>.

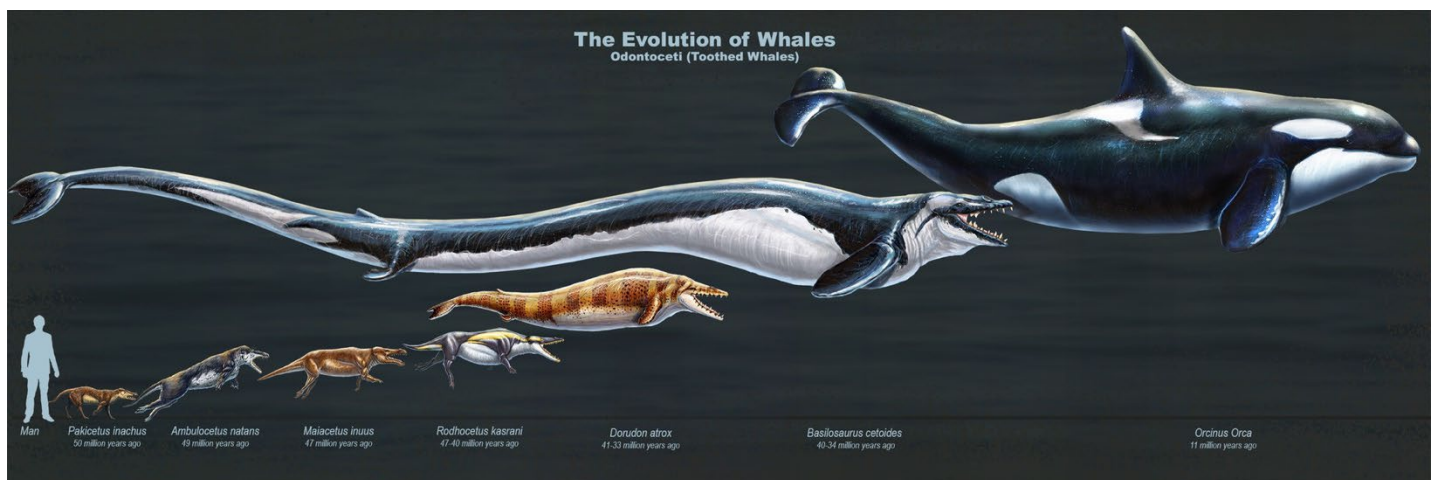
the incredibly complicated chemical process involving RNA and amino acids that first gave us life. However, I was more interested in the events that followed than I was in the chemistry that brought us life.

Over hundreds of millions of years, those newly formed organisms evolved to create DNA, grow cells, and develop reproductive abilities; a subsection of these living organisms soon found it advantageous to leave the pond that cradled our planet's first life forms and begin to live on land. Evolution continued and slowly these organisms evolved into a remarkably diverse group of species that wandered the earth. Fast-forwarding through a significant number of geological eras, mammals eventually began to wander the earth²¹ and soon small wolf-like creatures, called Pakicetus could be found scavenging the land for survival. My twelve-year old studies then helped me discover the engines for all of this change, the proverbial horse pulling the cart of evolution: genetic mutation and natural selection. Certain members of the wolf population were perhaps born with more webbed toes, or nostrils further back on their snout. These mutated wolves found that their “deformities” made it easier for them to find food in the sea and eventually, they passed these genes onto a new generation of webbed toed and increasingly amphibious wolves. Similar genetic deformities would occur in their lung capacity, vision, skin and vertebrate composition, and pretty much every other component of their bodies. Thus, the Pakicetus evolved into the Ambulocetus, followed by the Maiacetus, and so on until, about 11 million years ago the Orcinus Orca (modern day Orca Whale) first began swimming in our oceans²².

²¹ “Tracing the Face and Age of the Placental Mammal Ancestor: AMNH.” American Museum of Natural History. Accessed November 7, 2021. <https://www.amnh.org/explore/news-blogs/research-posts/tracing-the-face-and-age-of-the-placental-mammal-ancestor>.

²² “The Evolution of Whales.” Understanding Evolution. UC Berkeley. Accessed November 9, 2021. https://evolution.berkeley.edu/evolibrary/article/evograms_03.

The relationship between those early ancestors for the wolf and our modern orcas has not been completely erased by evolution. Physiologically, wolves and whales have similar bone structures in their legs and jaws, and the way the whale swims by moving its tail up and down (as opposed to side to side as most fish do) is very similar to the spinal movement that occurs in wolves when they run. Behaviorally, whales in general swim in groups very similar to the packs formed by wolves, many of the social roles of the wolf pack are even followed by their sea-dwelling counterparts.



When viewed with this macro-lens, from the beginning of life itself to the evolution of a specific species from the land to the sea, it becomes clear that my initial hypothesis was wrong. Nature is not in a state of static balance, wherein it rests at a “perfect equilibrium”. The law of nature is evolution. Species of plants and animals are constantly changing to better suit the needs of their environment. Those that evolve quickly thrive, and those that are unable to adapt don’t survive. My deep respect and appreciation for the natural environment of Kentucky should not be rooted in its ability to stay at a constant state, but rather in its ability to have adapted and evolved over millions of years to thrive in its current state. Thus, nature, much like the theories

that govern economics, has shown us that the seemingly balanced and perfect systems around us are only that way because they are ever changing and *progressing*.

My evaluation of economics and nature, while helpful in reframing what progress is and how we can measure it, forces us to consider incredibly large and complex systems governed by scientific and mathematical laws that go beyond the scope of this paper. Instead, I wanted to follow a single family to see how progress can occur on a much smaller scale, and who better than the man with whom this essay began – John Prine.

Just four years shy of 200 years after Thomas Walker first ventured into Kentucky, William Mason Prine and Verna Valentine, both originally from a small town in Muhlenberg County, Kentucky named Paradise, gave birth to their son John. John grew up at the lower end of the middle class in a suburb of Chicago, Illinois. Due to their family’s financial situation, family vacations were practically unheard of. However, nearly every summer the Prine family would drive over six hours from Chicago to the very town where William and Verna grew up, “down by the Green River where Paradise lay”²³.

Mason and Verna were not unique in their yearly summer visits. Around the turn of the century and continuing on through the early 1960’s, over 7 million residents of Appalachia left their homes and moved north to urban centers such as Detroit, Cleveland, Cincinnati, Pittsburg, Baltimore, and, like the young Prine family, Chicago²⁴. These 7 million southerners left the land their families had owned almost since the days of Thomas Walker to settle in cold and crowded cities because, much like the ancestral wolves that took to the sea, they had run out of options in their hometowns.

²³ Betts, Stephen L. “John Prine, One of America's Greatest Songwriters, Dead at 73.” Rolling Stone. Rolling Stone, April 10, 2020. <https://www.rollingstone.com/music/music-country/john-prine-obit-253684/>.

²⁴ Brumfield, Nick. “When Mountaineers Were America's Migration Crisis.” expatalachians, April 9, 2019. <http://expatalachians.com/when-mountaineers-were-americas-migration-crisis>.

The industrial revolution, with its many positive advances in technology led to the conglomeration of businesses in many sectors of the economy such as the coal industry. The newly empowered coal industries created entire towns that revolved around the mining business, and even built stores in which the only currency that was accepted was the bills printed by the coal companies. Every aspect of these miners' lives was controlled, and subsequently reliant upon the infrastructure provided by the coal companies. So when the mines would inevitably run out of coal, and the companies would leave, the people would be left in a state of almost unsalvageable economic depression²⁵. To make matters worse, the coal companies often took measures to ensure that they could always rely upon the people of Appalachia for cheap labor. These measures included incentivizing mining families to shortchange their education and taking drastic, even violent measures to prevent unionization.²⁶

Thus, the Prine's, like many families, saw no future for themselves in their beloved Appalachia and, having heard of new job opportunities in the northern cities, began the trek north where major industrial companies such as General Motors had begun to heavily recruit these southern immigrants who had a reputation for being able to work long, hard hours and were not prone to unionization. In a sentiment that even I feel as I sit in a library, now nearly 1,600 miles away from Kentucky, they longed to return home. Nearly every summer, millions of families would wear out US. Route 23 driving south to reconnect with the land, the culture, and

²⁵ Eller, Ronald D. "The War on Poverty in Appalachia - University of Kentucky." University of Kentucky. Accessed November 9, 2021. <https://www.uky.edu/CommInfoStudies/IRJCI/EllerPovertyWarAppalachiaOhioU.pdf>.

²⁶ "Addressing Substance Use Disorder in Appalachia." Appalachian Regional Commission, November 8, 2021. <https://www.arc.gov/addressing-substance-abuse-in-appalachia/>.

the people they loved. These yearly migrations eventually earned that oft traveled Route 23 a colloquial name – the Hillbilly Highway.

After graduating high school in Chicago, John Prine, with little desire to attend any more school took the advice of his brother Dave and became a mailman. As John walked the streets of suburban Chicago, he often hummed melodies and concocted clever lyrics, some of which would eventually become hit songs. His mail and amateur songwriting career were put on hold after two short years when Prine was drafted into the United States Army in 1966. Reluctant to fight in Vietnam, John got lucky and secured a mechanic position in what was then West Germany. In his classic humble southern wit, John summed up his military contribution in one of our country's deadliest wars as “drinking beer and pretending to fix trucks”.²⁷

Shortly after returning home from his service, John returned home and began to dedicate himself more seriously to his music. The songs he had written while working as a mailman and as a mechanic started to take the familiar shapes that would be performed over the next few decades. Additionally, he began to write new songs about the horrors of the Vietnam war, poverty in rural America, and environmental degradation. John, initially reluctant to perform these deeply personal and emotional songs, first took the mic in response to a “You think you can do better?” comment from a performer with whom he had been discussing their craft in a bar. He then took his new repertoire of songs and began playing around Chicago in various bars and coffee shops. It was from here that his career was launched.

Roger Ebert, a movie reviewer for the Chicago Sun-Times was assigned to watch a new movie on October 9, 1970. About midway through the movie, Ebert grew bored and decided to

²⁷ Betts, Stephen L. “John Prine, One of America's Greatest Songwriters, Dead at 73.” Rolling Stone. Rolling Stone, April 10, 2020. <https://www.rollingstone.com/music/music-country/john-prine-obit-253684/>.

wander around the city. It was then that he walked into one of Chicago's thousands of bars called the Fifth Peg and had the following experience:

*"He appeared on stage with such modesty he almost seemed to be backing into the spotlight. He sung rather quietly, and his guitar work was good, but he didn't show off. He started slow. But after a song or two, even the drunks in the room begin to listen to his lyrics. And then he has you."*²⁸

Within minutes, Prine's lyrical sincerity had captivated Roger Ebert and to this day he can't remember the name of the movie he had left. In place of his usual movie review the headline that week read "**Singing Mailman Delivers a Powerful Message in a Few Words**". Soon, folk and country legends like Johnny Cash, Kris Kristofferson, and Paul Anka were visiting Prine's shows and covering his songs. Before long, John Prine earned his position as one of the greats in the annals of folk and country, and his songs became anthems for the younger generation of baby boomers trying to save the world from war, inequality, and environmental degradation. They, like Prine, began to question whether all of our advances as humans could really be considered progress.

John Prine, from his easygoing southern personality to his lyrics and even the type of music he plays, is as much a product of evolution as the orca whales that swim the ocean. John was undoubtedly influenced by his Kentucky roots, but would not have received the exposure, nor the opportunities he had, if his parents had not decided to leave Appalachia to find a better life in a big city.

I began thinking about the idea of progress while driving the beautiful windy country roads of Kentucky. This was usually the place where I felt most at home in the world, an area that usually connected in my mind with feelings of peace, safety, and serenity. As I contemplated

²⁸ Ebert, Roger. "John Prine: American Legend: Features: Roger Ebert." Features | Roger Ebert. Accessed November 9, 2021. <https://www.rogerebert.com/features/john-prine-american-legend>.

the trajectory of “mankind’s progress” though, these feelings were replaced with fear. I was fearful that my children would inherit a world that was dirtier and more dangerous than the one I had found. John Prine had recently died of complications related to the COVID-19 virus, and I began to worry that the new resting state of life would be shrouded in fear and a lack of social cohesion. I found great comfort however, in examining the trajectory of the economy and the natural world. Achieving perfection, for both man and systems, requires constant change – constant evolution. Unfettered capitalism brought us economic progress, but a partial return to government regulations can bring us equality. Pakicetus, the ancestor of both wolves and whales, proved the necessity of evolution by adapting to thrive in a habitat so far from its original domain that many educated people still refuse to believe it happened.

I would contend with Poe and St. Augustine’s conclusion that man is inherently evil. Rather, like the natural world around us, we require constant change. We must occasionally leave our homes behind and travel to the sea to find new opportunities; we must continue to evolve in order to survive. Much like economic theory, mankind is occasionally wrong. We can be overzealous in our use of natural resources or rely too much on ideals like the free market. These missteps can lead us to believe that we are progressing while in reality the world around us is regressing. While I am still far from concretely defining the *progress of man*, I am confident that progress must include constant, sustainable change.

John Prine closes *Paradise* with this fitting verse:

*When I die let my ashes float down the Green River
Let my soul roll on up to the Rochester dam
I'll be halfway to Heaven with Paradise waitin'
Just five miles away from wherever I am.*

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