

Chapter 1 : Examples of Paradox

This simple question is the crux of a paradox first posed by the ancient Greek philosopher Zeno, and it has made generations of math students question the nature of reality every time they walk.

Foremost is that The Jevons Paradox identifies a pattern of economic behavior that is asserted as support to arguments against favoring energy efficiency in the use of fossil fuels. Thereby it also is used against proposals to reduce and reverse contributions of carbon dioxide to the global warming process. The conventional economic wisdom associated with The Jevons Paradox declares that efficiency strategies produce contradictory results and asserts that market based solutions will always be the best solutions. This use of neo-classical economics and its heirs adds additional obstacles by also being reductive by taking environmental, geological, and engineering problems and recasting them into the terms of conventional economic wisdom. Conventional economic wisdom has the strategic advantages of being both counter intuitive and financially well supported. A third advantage of conventional economic wisdom is that most of its critics are by choice ill prepared to evaluate and respond either with. Examining The Jevons Paradox should lead at least to the conclusion that economics as a field of interest should not be abandoned to the current practitioners of predatory economism. Along the way there will be reasons enough to question the nature of anti-inductive approach to social science and the too often faith based nature of the cultural critiques favoring societal change. A further reason to examine the use of free market economics is that our economic systems are largely centralized and sustained by fossil fuels. Understanding The Jevons Paradox is thereby pivotal to the restructuring of our economic practices toward relocalization. Given that the majority of the remaining reserves of oil and natural gas are outside of the United States, this examination will reveal the motivations and objectives of what is applied as the basis of much of neo-colonial foreign policy. In summary, examining The Jevons Paradox leads us straight into our current tangle of societal and cultural problems. It is effectively a cusp point of several important threads. Jevons by Jevons William Stanley Jevons was a British economist who is noted as one of the pioneers of neoclassical economic analysis. Jevons is credited with three contributions to the history of economic ideas. The adjective "neo-classical economics" references Adam Smith, David Ricardo, and others of the 18th century as the classical "free market" economists. The current nominal "neo-liberal" economists which are dominant among mainstream academic economists and conventional policy advocates are the current heirs to the "free market" legacy. For Jevons, the utility or value to a consumer of an additional unit of a product is inversely related to the number of units of that product they already own, at least beyond some critical quantity. To translate this into more common terms, each additional widget or unit of something will have less value for a consumer when it is collected in a pile of like widgets and units. His second contribution is noted as having recognized the applicability of mathematics to economics. He is acknowledged as a precursor to "modern" mathematical economics by his publication of General Mathematical Theory of Political Economy in In this book he outlined his marginal utility theory of value as well as asserting the mathematical nature of economics. In this book he observed that the consumption of coal as a fuel did not follow the marginal utility theory of value. He declared that the increased efficiency in the production of a natural resource such as coal resulted in the increased demand for coal not a reduction in its use. Based upon this he declared that that Great Britain would in time deplete its coal resources. On this point Jevons is seen as a predecessor to the analysts who today predict the peaking of the production and distribution of oil and natural gas. Thereby Jevon declared that "It is wholly a confusion of ideas. First, to Jevons the effects of efficiency technologies, as they effected economic behavior related the early 19th century English coal industry, seemed contrary to his understanding of the marginal utility theory of value. His expectation was that each additional unit would have less value. Instead it seemed that the value of a unit of coal increased even if the price of that unit went down. A less simplistic interpretation would have identified coal as a commodity having strategic utility in the powering of an economy and for providing ongoing comfort. Support, Corollaries, and Presumptions There are several contemporary examples that are applied as evidence in support of The Jevons Paradox. Even though OPEC was a marginal supplier, its

embargo resulted in the cost of gasoline increasing throughout the world by real and apparent shortages. Suddenly large gas guzzling cars were avoided in favor of more energy-efficient vehicles. This conservation strategy was soon followed by a gradual increase in the demand for fuel because driving increased and the number of cars on the road soon doubled. Similarly, technological improvements in refrigeration have led to more and larger refrigerators. The same tendencies are in effect within industry, independent of household consumption. The same pattern has been reflected in the past 15 or so years in the rising popularity of the super sized "McMansion" housing developments, where energy efficiency technologies have been used to control the operating costs of houses so that the square footage of the houses can be significantly increased. All are also examples of the escalation of the expectations of consumption. The conventional interpretation is that efficiency technologies often result in the expansion of consumption patterns by individuals rather than actually conserving energy. So, by applying this reasoning to energy efficiency as related to oil and natural gas use, we are told that we will actually stimulate the growth of oil and natural gas consumption and accelerate their depletion rates. Part of this economic prediction is based upon the assumption of an elasticity of demand, that there is an often latent demand that is revealed upon the drop in the cost of energy or of other commodities. The offered amendment to the theory of marginal utility is that a change in the efficiency or expense of obtaining a product may cause changes in the price of that commodity to the consumer. This basic approach also defines the fuel used to produce a product to be a marginal cost of that production. The issue of depletion of a resource, including fossil fuels, has been rated by conventional economists as a non-issue. By extension, when a fossil fuel is depleted or becomes too expensive, then by providing subsidies and other incentives a new energy source will be created to replace the prior primary energy source. By the nature of the substitution process, fuels, even high energy fossil fuels, are regarded as no different than any other economic commodity. All along the way little attention is given to the actual effects of the centralized and corporatized macro economic systems, their vulnerabilities, and the collateral effects that these priorities and structures sustain. By the sheer concentrated dependency upon an unusually energy rich fossil fuel the lack of diversity alone describes the incapacity to adapt to change. This application of the replacement assumption seems to indicate that although conventional economists often boast of great facility with the use of mathematical models, they also seem to have a few problems with arithmetic. The first is the net energy yield of production of ethanol both requires the use of a fuel itself and the net gain of the return of energy used as compared to the energy content produced is only weakly positive. The second problem is that the total amount of available arable land is substantially less than the amount of land that would be needed to grow both food for our population and crops for ethanol production for our economies and transportation. The collateral damage of starvation and global warming are not even admitted entry into the actual calculations being indulged. Alternative fuels which have levels of energy returned for the related energy invested roughly equivalent to oil and natural gas still remain to be discovered. The primary attraction of the proposed replacement fuels seems to be that by prioritizing the maintenance of a particular economic order. As an alternative energy source, conservation and energy efficiency has been largely been considered only as it serves the expansion of consumption, profits, and as an affirmation of The Jevons Paradox. The first is the mass transit in the US as it historically existed prior to its dismantling by the US auto related industry. The efficient use of energy was by design reduced to increase both consumption and corporate profits. This advocacy of a New American Dream was accompanied by a massive public relations campaign which inflated racism and elitism. The second example is mass transit as it currently exists in Europe. It is difficult to not identify mass transit as an energy efficiency technology. In the presence of effective regulatory institutions or alternatives, and of the treatment of fuel as a strategic economic utility The Jevons Paradox does not seem to have any basis. The anomalous behaviors as described by The Jevons Paradox are produced by additional institutional factors, including governance, economic, and societal. The Jevons Paradox is simply a product of a particular set of economic ideas and assumptions. In effect economic security and political institutions have been reverse engineered to serve corporate wealth. As an example, related industries have acted to oppose the increasing of the standards of residential insulation for new residential construction in order to preserve their profits. Efficiency in production caused by inefficiency in the use of resources The obstruction of mass transit in the US has been

used to expand profits more than serving the interests of the population. Energy efficiency strategies applicable to industry, transportation, and buildings have been available for a long time, at least decades, and with certain exceptions have attracted only limited attention. The concentrated control of strategic economic sectors has not only enjoyed unregulated profits it has also generally not contributed a proportionate to support of commons infrastructure and has also constrained the choices of other industrial sectors. The assumption of economies of scale is based upon having access to high energy fuels by which the distribution of goods over a wider consumption base can be supported. Without this variety of high energy content fuels this centralization would not be possible. In these terms as the real net energy cost of distribution increases, then centralization should be reversed toward greater localization. The points here are that we can ill afford to dismiss the importance of community economics or the details of what it is intended in the advocacy for the relocation of communities. We also need to recognize that attempting to maintain the current implicit priorities will cause great harm to our communities. If the analysts and advocates who recognize the likely effects of the peaking of the production and distribution of oil and natural gas concentrate primarily upon technological energy efficiency we are likely to leave in place the incumbent economic and societal conventions. Another is the assumption that economic growth will not be limited by the availability of natural resources both strategic and general. Another contradiction is the assumption that energy sources such as natural gas and petroleum are replaceable as strategic economic commodities. Another is that the unregulated distribution of surplus value as the invisible hand theology promotes is in the best interest of the general population. Also, to reject the domain of economics carte blanc and its contribution to solutions, also tacitly accepts the current mainstream assumptions as the default paradigm. By definition a scientific theory has to be adequate to the field of phenomena that it is established to predict. If this is not the case, then what is proposed is more on the order of an ideology than a scientific theory. To rephrase, statements of theory must adapt to the reality of the behavior it proposes to predict. Conforming real behavior into supposed theories for the sake of a standard of falsifiability, seems simply backwards. Paradoxes arise only when a field of phenomena does not conform to a proposed theory and its assumptions, both explicit and tacit. When organizations and communities hit an economic crisis, real or imagined, without a useful alternative economic analysis the default choice will remain the conventional economic wisdom and the posturing of fiscal conservatism reigns in place of insight. **The Inelasticities of Demand** It is not really a surprise or a paradox that under a higher priority for the conservation of energy or under a marked increase in the efficiency in producing any product that a new population of people might be able to afford to live in the manner that they have been aspiring to for decades if not longer. This is a product of class structure, advancing standards of consumption, direct usury, and complicit usury. The default model of production is structured to maximize wealth extraction and then consumption as it serves the wealth extraction process. It is pretty much a fact that low income people are strongly interested in sharing the middle class standard of consumption. That former colonies should also be expected to have as a goal some level of economic self sufficiency and parity of consumption is also not a surprise. What is also rarely admitted is that the aspirations represented by the concept of the elasticity of demand might be realized by alternative strategies as well. That human cultures have the capacity to adapt though often unwillingly, unpracticed, and supported by short attention spans. The implications of the fact that the reserves of fossil fuels are declining and of the very likely economic implosions does not seem to be even on the general cultural radar. While this pattern demonstrates typical forms of the elasticity of demand relative to certain products, it does not address the often assumed nature of that demand. That the effects of the depletion of fossil fuels, global warming, and systemic economic collapse will be primarily economic in nature is certain. That low income people will be hit first, foremost, and hardest by these economic effects is also certain. The increasing economic calamities are likely to be experienced as simply an increase in the already existing social inequities and hardships. Occasionally individual experience of being reduced within the commons to wide spread tragedy. Scarcities will create demand for products which were once easily available.

Chapter 2 : paradox - Wiktionary

This chapter defines a paradox, roughly and superficially, as an assembly of apparently reasonable considerations that engender conflicting inclinations about what to believe, and hence a form of cognitive tension.

The second law of thermodynamics seems to be violated by a cleverly operated trapdoor. Hot water can, under certain conditions, freeze faster than cold water, even though it must pass the lower temperature on the way to freezing. Biology[edit] Antarctic paradox: In some areas of the oceans, phytoplankton concentrations are low despite there apparently being sufficient nutrients. Genome size does not correlate with organismal complexity. For example, some unicellular organisms have genomes much larger than that of humans. Even a tiny fecundity advantage of one additional offspring would favor the evolution of semelparity. Despite their relatively small muscle mass, dolphins can swim at high speeds and obtain large accelerations. Exposure to small doses of toxins can have beneficial effects. Persistent female choice for particular male trait values should erode genetic variance in male traits and thereby remove the benefits of choice, yet choice persists. When rising to stand from a sitting or squatting position, both the hamstrings and quadriceps contract at the same time, despite their being antagonists to each other. Increasing the food available to an ecosystem may lead to instability, and even to extinction. Paradox of the pesticides: Paradox of the plankton: Why are there so many different species of phytoplankton, even though competition for the same resources tends to reduce the number of species? An anomalous pattern of inheritance in the fragile X syndrome. When did the ancestors of birds live? Health and nutrition[edit] French paradox: The observation that the French suffer a relatively low incidence of coronary heart disease, despite having a diet relatively rich in saturated fats, which are assumed to be the leading dietary cause of such disease. The large amount of glycogen in the liver cannot be explained by its small glucose absorption. The finding that Hispanics in the United States tend to have substantially better health than the average population in spite of what their aggregate socio-economic indicators predict. The observation that Israelis suffer a relatively high incidence of coronary heart disease, despite having a diet very low in saturated fats, which are assumed to be the leading dietary cause of such disease. The amplitude of heart rate oscillations during meditation was significantly greater than in the pre-meditation control state and also in three non-meditation control groups [5] Mexican paradox: Mexican children tend to have higher birth weights than can be expected from their socio-economic status. Although the negative health consequences of obesity in the general population are well supported by the available evidence, health outcomes in certain subgroups seem to be improved at an increased BMI. Humans and other small-to-medium-sized mammals get cancer with high frequency, while larger mammals, like whales, do not. If cancer is essentially a negative outcome lottery at the cell level, and larger organisms have more cells, and thus more potentially cancerous cell divisions, one would expect larger organisms to be more predisposed to cancer. A pulsus paradoxus is an exaggerated decrease in systolic blood pressure during inspiration. It can indicate certain medical conditions in which there is reduced cardiac output, such as cardiac tamponade or constrictive pericarditis. Also known as the Pulse Paradox. Although the individual is more wakeful and aware of their surroundings, they are continuing to accrue sleep debt and thus, are actually exacerbating their sleep deprivation. Chemistry[edit] Faraday paradox electrochemistry: Diluted nitric acid will corrode steel, while concentrated nitric acid will not. The length of time that it takes for a protein chain to find its folded state is many orders of magnitude shorter than it would be if it freely searched all possible configurations. Exceptions to the principle that a small change in a molecule causes a small change in its chemical behavior are frequently profound. Time travel[edit] Bootstrap paradox , also ontological paradox Can a time traveler send himself information with no outside source? A billiard ball can be thrown into a wormhole in such a way that it would emerge in the past and knock its incoming past self away from the wormhole entrance, creating a variant of the grandfather paradox. A man travels back in time to discover the cause of a famous fire. While in the building where the fire started, he accidentally knocks over a kerosene lantern and causes a fire, the same fire that would inspire him, years later, to travel back in time. The bootstrap paradox is closely tied to this, in which, as a result of time travel, information or objects appear to have no beginning. What happens when a time traveler does

things in the past that prevent him from doing them in the first place? You travel back in time and kill a famous person in history before they become famous; but if the person had never been famous, then he could not have been targeted as a famous person. Linguistics and artificial intelligence[edit] Bracketing paradox: Is a "historical linguist" a linguist who is historical, or someone who studies "historical linguistics"? How can a language both enable communication and block communication? Logical thought is hard for humans and easy for computers, but picking a screw from a box of screws is an unsolved problem. In transformational linguistics, there are pairs of sentences in which the sentence without movement is ungrammatical while the sentence with movement is not. In automated handwriting recognition, a cursive word cannot be recognized without being segmented and cannot be segmented without being recognized. Philosophy[edit] Paradox of analysis: It seems that no conceptual analysis can meet the requirements both of correctness and of informativeness. If Plato says "If you make a false statement, I will throw you in the water", and Socrates responds, "You will throw me in the water", there is no way for Plato to keep his promise. How can people experience strong emotions from purely fictional things? If all truths are knowable, then all truths must in fact be known. Paradox of free will: If God knows in advance how we will decide, how can there be free will? Why can induction be used to confirm that things are "green", but not to confirm that things are "grue"? When one pursues happiness itself, one is miserable; but, when one pursues something else, one achieves happiness. If asking oneself "Am I dreaming? A paradoxical game between two players, one of whom can predict the actions of the other. Several distinct paradoxes share this name. Can an omnipotent being create a rock too heavy for itself to lift? The author of a book may be justified in believing that all his statements in the book are correct, at the same time believing that at least one of them is incorrect. Epicurean paradox The existence of evil seems to be incompatible with the existence of an omnipotent, omniscient, and morally perfect God. Even though rules are intended to determine actions, "no course of action could be determined by a rule, because any course of action can be made out to accord with the rule". When a white horse is not a horse: White horses are not horses because white and horse refer to different things. In Kabbalah , how to reconcile self-awareness of finite Creation with Infinite Divine source, as an emanated causal chain would seemingly nullify existence. Economics paradoxes One class of paradoxes in economics are the paradoxes of competition , in which behavior that benefits a lone actor would leave everyone worse off if everyone did the same. These paradoxes are classified into circuit, classical and Marx paradoxes. A book arguing that antitrust enforcement artificially raised prices by protecting inefficient competitors from competition. To sell information you need to give it away before the sale. Two players reaching a state of Nash equilibrium both find themselves with no profits gained via exploitation. Adding extra capacity to a network can reduce overall performance. Consumption varies surprisingly smoothly despite sharp variations in income. Increasing road capacity at the expense of investments in public transport can make overall congestion on the road worse. For countries with income sufficient to meet basic needs, the reported level of happiness does not correlate with national income per person. With capacity constraints, there may not be an equilibrium. The perceived failure of European countries to translate scientific advances into marketable innovations. Why were interest rates and prices correlated? Increasing the price of bread makes poor people eat more of it. Inability to recoup cost of obtaining market information implies efficient markets cannot exist. Some businesses bring about their own downfall through their own successes. Increases in efficiency lead to even larger increases in demand. Some countries export labor-intensive commodities and import capital-intensive commodities, in contradiction with the Heckscher-Ohlin theorem. Paradox of luxury goods. The more expensive some commodity is, less it is used after acquiring. Capital is not flowing from developed countries to developing countries despite the fact that developing countries have lower levels of capital per worker, and therefore higher returns to capital. Actions that may be vicious to individuals may benefit society as a whole. Keeping everyone out of an information system is impossible, but so is getting everybody in. The imposition of a tariff on imports may reduce the relative internal price of that good. Why do generations that significantly improve the economic climate seem to generally rear a successor generation that consumes rather than produces? If everyone saves more money during times of recession, then aggregate demand will fall and will in turn lower total savings in the population. If everyone tries to work during times of recession, lower wages will reduce prices, leading to

more deflationary expectations, leading to further thrift, reducing demand and thereby reducing employment. Paradox of value , also known as diamond-water paradox: Water is more useful than diamonds, yet is a lot cheaper. Worker productivity may go down, despite technological improvements. Using the Kaldor-Hicks criterion , an allocation A may be more efficient than allocation B, while at the same time B is more efficient than A. Successfully fixing a problem with a defective product may lead to higher consumer satisfaction than in the case where no problem occurred at all. People will only offer a modest fee for a reward of infinite expected value.

Chapter 3 : List of paradoxes - Wikipedia

Shout outs to Douglass Hofstadter. His book (I am a Strange Loop) is at the core of this film. Starring Steve Ellis and Jaminson Riggs.

Zeno of Elea a. His Life Zeno was born in about B. He was a friend and student of Parmenides, who was twenty-five years older and also from Elea. He was not a mathematician. Zeno is reported to have been arrested for taking weapons to rebels opposed to the tyrant who ruled Elea. When asked about his accomplices, Zeno said he wished to whisper something privately to the tyrant. But when the tyrant came near, Zeno bit him, and would not let go until he was stabbed. It was said to be a book of paradoxes defending the philosophy of Parmenides. A thousand years after Zeno, the Greek philosophers Proclus and Simplicius commented on the book and its arguments. They had access to some of the book, perhaps to all of it, but it has not survived. Proclus is the first person to tell us that the book contained forty arguments. This number is confirmed by the sixth century commentator Elias, who is regarded as an independent source because he does not mention Proclus. Unfortunately, we know of no specific dates for when Zeno composed any of his paradoxes, and we know very little of how Zeno stated his own paradoxes. We do have a direct quotation via Simplicius of the Paradox of Denseness and a partial quotation via Simplicius of the Large and Small Paradox. In total we know of less than two hundred words that can be attributed to Zeno. Our knowledge of these two paradoxes and the other seven comes to us indirectly through paraphrases of them, and comments on them, primarily by his opponents Aristotle B. The names of the paradoxes were created by later commentators, not by Zeno. His Goals In the early fifth century B. Reality, he said, is a seamless unity that is unchanging and can not be destroyed, so appearances of reality are deceptive. Our ordinary observation reports are false; they do not report what is real. Although we do not know from Zeno himself whether he accepted his own paradoxical arguments or exactly what point he was making with them, according to Plato the paradoxes were designed to provide detailed, supporting arguments for Parmenides by demonstrating that our common sense confidence in the reality of motion, change, and ontological plurality that is, that there exist many things , involve absurdities. His Dichotomy and Achilles paradoxes presumably demonstrate that any continuous process takes an infinite amount of time, which is paradoxical. Because both continuous and discontinuous change are paradoxical, so is any change. Eudemus, a student of Aristotle, offered another interpretation. Zeno was actually challenging the Pythagoreans and their particular brand of pluralism, not Greek common sense. Zeno was not trying to directly support Parmenides. His Method Before Zeno, Greek thinkers favored presenting their philosophical views by writing poetry. Zeno began the grand shift away from poetry toward a prose that contained explicit premises and conclusions. And he employed the method of indirect proof in his paradoxes by temporarily assuming some thesis that he opposed and then attempting to deduce an absurd conclusion or a contradiction, thereby undermining the temporary assumption. This method of indirect proof or *reductio ad absurdum* probably originated with his teacher Parmenides [although this is disputed in the scholarly literature], but Zeno used it more systematically. The Standard Solution to the Paradoxes Any paradox can be treated by abandoning enough of its crucial assumptions. A paradox is an argument that reaches a contradiction by apparently legitimate steps from apparently reasonable assumptions, while the experts at the time cannot agree on the way out of the paradox, that is, agree on its resolution. It is this latter point about disagreement among the experts that distinguishes a paradox from a mere puzzle in the ordinary sense of that term. This resolution is called the Standard Solution. It points out that, although Zeno was correct in saying that at any point or instant before reaching the goal there is always some as yet uncompleted path to cover, this does not imply that the goal is never reached. The details presuppose differential calculus and classical mechanics as opposed to quantum mechanics. The Standard Solution treats speed as the derivative of distance with respect to time. It assumes that physical processes are sets of point-events. It implies that durations, distances and line segments are all linear continua composed of indivisible points, then it uses these ideas to challenge various assumptions made, and inference steps taken, by Zeno. Aristotle did not believe that the use of mathematics was needed to understand the world. No single person can be credited with creating it. In

ordinary discourse outside of science we would never need this kind of precision, but it is needed in mathematical physics and its calculus. By "real numbers" we do not mean actual numbers but rather decimal numbers. Their calculus is a technique for treating continuous motion as being composed of an infinite number of infinitesimal steps. After the acceptance of calculus, most all mathematicians and physicists believed that continuous motion should be modeled by a function which takes real numbers representing time as its argument and which gives real numbers representing spatial position as its value. This position function should be continuous or gap-free. In addition, the position function should be differentiable in order to make sense of speed, which is treated as the rate of change of position. By the early 20th century most mathematicians had come to believe that, to make rigorous sense of motion, mathematics needs a fully developed set theory that rigorously defines the key concepts of real number, continuity and differentiability. Doing this requires a well defined concept of the continuum. Unfortunately Newton and Leibniz did not have a good definition of the continuum, and finding a good one required over two hundred years of work. The continuum is a very special set; it is the standard model of the real numbers. Intuitively, a continuum is a continuous entity; it is a whole thing that has no gaps. The continuum is the mathematical line, the line of geometry, which is standardly understood to have the same structure as the real numbers in their natural order. Real numbers and points on the continuum can be put into a one-to-one order-preserving correspondence. There are not enough rational numbers for this correspondence even though the rational numbers are dense, too in the sense that between any two rational numbers there is another rational number. These definitions are given in terms of the linear continuum. Physical space is not a linear continuum because it is three-dimensional and not linear; but it has one-dimensional subspaces such as paths of runners and orbits of planets; and these are linear continua if we use the path created by only one point on the runner and the orbit created by only one point on the planet. Regarding time, each point instant is assigned a real number as its time, and each instant is assigned a duration of zero. The time taken by Achilles to catch the tortoise is a temporal interval, a linear continuum of instants, according to the Standard Solution but not according to Zeno or Aristotle. Of the ten known paradoxes, The Achilles attracted the most attention over the centuries. It was generally accepted until the 19th century, but slowly lost ground to the Standard Solution. Some historians say Aristotle had no solution but only a verbal quibble. The period lasted about two hundred years. There are four reasons. Point 2 is discussed in section 4 below. Today, most philosophers would not restrict meaning to empirical meaning. They believe in indivisible points even though they are not even indirectly observable. However, for an interesting exception see Dummett which contains a theory in which time is composed of overlapping intervals rather than durationless instants, and in which the endpoints of those intervals are the initiation and termination of actual physical processes. This idea of treating time without instants develops a proposal of Russell and Whitehead. Point 1 is about the time it took for classical mechanics to develop to the point where it was accepted as giving correct solutions to problems involving motion. Point 1 was challenged in the metaphysical literature on the grounds that the abstract account of continuity in real analysis does not truly describe either time, space or concrete physical reality. This challenge is discussed in later sections. Point 4 arises because the standard of rigorous proof and rigorous definition of concepts has increased over the years. The key idea was to work out the necessary and sufficient conditions for being a continuum. To achieve the goal, the conditions for being a mathematical continuum had to be strictly arithmetical and not dependent on our intuitions about space, time and motion. Similarly, rigor was added to the definitions of the physical concepts of place, instant, duration, distance, and instantaneous speed. The relevant revisions were made by Euler in the 18th century and by Bolzano, Cantor, Cauchy, Dedekind, Frege, Hilbert, Lebesgue, Peano, Russell, Weierstrass, and Whitehead, among others, during the 19th and early 20th centuries. In , Berkeley had properly criticized the use of infinitesimals as being "ghosts of departed quantities" that are used inconsistently in calculus. Earlier Newton had defined instantaneous speed as the ratio of an infinitesimally small distance and an infinitesimally small duration, and he and Leibniz produced a system of calculating variable speeds that was very fruitful. But nobody in that century or the next could adequately explain what an infinitesimal was. The practical use of infinitesimals was unsystematic. In addition, consider the seemingly obvious Archimedean property of pairs of positive numbers: This property fails if A is an infinitesimal.

Wisdom points out, p. This standard real analysis lacks infinitesimals, thanks to Cauchy and Weierstrass. The rational numbers are not continuous although they are infinitely numerous and infinitely dense. To come up with a foundation for calculus there had to be a good definition of the continuity of the real numbers. But this required having a good definition of irrational numbers. The result was a clear and useful definition of real numbers. A Dedekind cut A, B is defined to be a partition or cutting of the set of all the rational numbers into a left part A and a right part B . A and B are non-empty subsets, such that all rational numbers in A are less than all rational numbers in B , and also A contains no greatest number. Every real number is a unique Dedekind cut. The cut can be made at a rational number or at an irrational number. Here are examples of each: Otherwise, the cut defines an irrational number which, loosely speaking, fills the gap between A and B , as in the definition of the square root of 2 above. By defining reals in terms of rationals this way, Dedekind gave a foundation to the reals, and legitimized them by showing they are as acceptable as actually-infinite sets of rationals. But what exactly is an actually-infinite or transfinite set, and does this idea lead to contradictions? This question needs an answer if there is to be a good theory of continuity and of real numbers. In the 1870s, Cantor clarified what an actually-infinite set is and made a convincing case that the concept does not lead to inconsistencies.

Chapter 4 : The Mysterious Nature of Paradox - Ohr Chadash

Paradox is, in this sense, the nature of irrationality and is often a contributor to the phenomenon of delusion; often aided by the use of an indefinite pronoun. Examples: The collection of all sets which have nothing in them.

By its very nature paradox is inherently mysterious, and when deeply contemplated, forces us to develop pathways in our minds and souls that we hardly knew were there. Perhaps this portion is directing us to ponder these issues, as a number of other highly paradoxical and mysterious incidents occur in it. In this section, we will not investigate each and every narrative in depth; instead, we will focus on their paradoxical natures and the paradoxical web linking them. One of the most difficult matters to understand in the Torah is God denying Moses and Aaron entry into the Land of Israel because Moses hit the rock to bring forth water instead of speaking to it as God had commanded. Many commentators have expressed surprise and wonder that such a seemingly small error would result in such a drastic punishment. Indeed, given that Moses was commanded to hit the rock with his staff on a previous occasion and God instructed Moses to bring the very staff he had used with him this time as well, the punishment seems unduly harsh. One constant theme mentioned by many of the commentators trying to resolve this enigma is that it appears that God never had any intention of allowing Moses to lead the people into the Promised Land. Thus, we are once again confronted with the paradox of free will and Divine Providence. A second puzzling incident occurs when, in response to the Jewish people speaking out against God and Moses again, poisonous snakes appear and bite the people causing many to die. When the people come to Moses, admit their mistake, and beg him to pray for them, God tells him to fashion the figure of a snake and mount it on a pole. All those who had been bitten were instructed to stare at the snake and then they would be healed. Why did God want to heal the people by having them stare at the very image of the animal that had fatally wounded them? Why did God have them stare at and apparently be healed by not to mention having Moses fashion what to all intents and purposes seems to have been an idol? The Talmud warns us against erring by thinking that the snake on the staff had any power of its own. When the people looked upwards and were, therefore, moved to contritely ask for Divine assistance, God Himself healed them. Could the people not have been instructed to repent and pray to God without the means of the physical image? Part of the answer seems to be that although everything is ultimately dependent on God, He fashioned a world that requires man to do his part. The snake represents an antidote that was needed to heal the people, a tool intended to remind the people of why they had been bitten in the first place. Only after remembering this could they turn remorsefully to God, so that He could, in turn, heal them. Although God does not explicitly tell Moses what material to fashion the snake out of, the Torah informs us that he used copper. The Hebrew word for copper *nechoshet* shares the very same root with the Hebrew word for snake *nachash*. This common root alludes to many deep insights concerning the healing process and the psychology of healing highlighted by this incident. From a purely logical point of view, the human approach seems to make more sense, for instance, we pour water on fire to extinguish it. Homeopathy is based on the same principle. Significantly, not only is the bite of the *nachash* cured by staring at the *nachash nechoshet* copper snake, the pole that Moses mounted the copper serpent on is referred to as a *nes*, which means both pole and miracle. It is no wonder then that the Western world adopted the symbol of the snake on the staff as the emblem of the medical profession. This goes against the natural human inclination of avoiding the source of that painful experience at all costs. Indeed, people often resort to drastic measures to mask their pain that are sometimes even more dangerous to them physically and mentally than the original cause of the suffering. For the ultimate paradox is the mystery of life and death itself, as *Pirkei Avot 4*: This phrase flies in the face of our initial assumption that death is a jarring or abrupt passage between worlds. Although death can certainly be unexpected and at times even violent, here we are given a glimpse of a different type of death, one which promises a smooth and comforting transition from life to death. From a Jewish perspective, this type of peaceful death is reassuring, since it confirms that death is merely a portal to life lived in a different dimension. Birth and death, and in fact every moment in between, are charged with paradox and mystery. Yet, if we approach life with a sense of wonder and a desire to break through the normative barriers of understanding, our time in this world can assume new

meaning and offer tremendous opportunities. As Chukat demonstrates there is no better guide to lead us through the complexities of life and death than the Torah, whose very essence contains the light necessary to illuminate our ways through the contradictions and challenges we constantly face.

Chapter 5 : Some universal laws and paradoxes of human nature

Or, optionally, a fictional paradox, or a real problem, or a paradoxical paradox, or a solution for which you will never know the paradox. I have found a good rule to follow is only paradoxes are paradoxical, and so on for anything: the philosophy called applicationism.

In love the paradox occurs that two beings become one and yet remain two. Love is directed towards what lies hidden in its object. **The Paradoxical Nature of Hatred** It is a great mistake to suppose that love unites and unifies men. Love diversifies them, because love is directed towards individuality. The thing that really unites men and makes them like to each other is hatred. **Chesterton** The more alike the enemy becomes, the more different he will appear. **The Paradoxical Nature of Freedom** Freedom is not doing what you want, freedom is wanting to do what you have to do The mode in which the inevitable comes to pass is through effort. **Oliver Wendell Holmes** Men cannot escape from obedience to God. The only choice given to men, as intelligent and free creatures, is to desire obedience or not to desire it. If a man does not desire it he obeys, nevertheless, perpetually, in as much as he is a slave to his instincts and passions. **Dostoyevsky** said that man acts in the way he feels like acting and not necessarily in his best interests. Renunciation is the way to experience freedom. Self-imposed limits are the way to experience freedom. **The Paradoxical Nature of Knowledge** Things are simultaneously knowable and incomprehensible. Knowledge is a paradox. The meeting and marriage of subject and object, of a receptive mind and a strange fact is what we mean by the word knowledge. When we know something we bring it down to the level of our intelligence. **The Paradoxical Nature of Understanding** The whole secret of mysticism is that a person can understand everything with the help of what he does not understand. The logician seeks to make everything clear, and only succeeds in making everything mysterious. The mystic allows a few things to remain mysterious, and everything else becomes clear. Sometimes it proves the highest understanding not to understand. **Gracian** **The Paradoxical Nature of Truth** Almost every wise saying has an opposite one, no less wise to balance it. **George Santayana** The opposite of a correct statement is a false statement. But the opposite of a profound truth may well be another profound truth. **Niels Bohr** The ordinary man has always cared more for truth than for consistency. If he saw two truths that seemed to contradict each other, he would take the two truths and the contradiction along with them. His spiritual [or intellectual] sight is stereoscopic, like his physical sight: **Pascal** It is idle to talk always of the alternative of reason and faith. Reason is itself a matter of faith. It is an act of faith to assert that our thoughts have any relation to reality at all. Why should not good logic be as misleading as bad logic? Are they not both movements in the brain of a bewildered ape? Exactly what does breed insanity is reason. **Chesterton** If you argue with a madman, it is extremely probable that you will get the worst of it; for in many ways his mind moves all the quicker for not being delayed by the things that go with good judgement. He is not hampered by a sense of humour or by charity, or by the dumb certainties of experience. He is the more logical for losing certain sane affections. Indeed, the common phrase for insanity is in this respect a misleading one. The madman is not the man who has lost his reason. The madman is the man who has lost everything except his reason. **Chesterton** Insanity is often the logic of an accurate mind overtaxed. **Oliver Wendell Holmes** Madness may be defined as using mental activity so as to reach mental helplessness. To believe with certainty we must begin with doubting. **Chesterton** **The Paradoxical Nature of Sin** I tell you, in heaven there will be more rejoicing over one sinner who repents, than over ninety-nine souls that are justified, and have no need of repentance. Thus we have the paradox of good coming out of evil. The evil of sin is a necessary prerequisite for the joy that is occasioned by repentance. Where men are trying to compete with each other they are trying to copy each other. Personality, in becoming a conscious ideal, becomes a common ideal. **Chesterton** **The Paradoxical Nature of Competition** True competition is identical with true cooperation. In overcoming the obstacles presented by the other both competitors grow stronger and each participates in the development of the other. Conflict or competition carried to an extreme will tend to produce sameness on all sides. A single inexorable logic will finally reduce everything to the same terms. Rivals grow more alike with every new attempt to be different and this causes them to intensify their conflict. **The Paradoxical Nature of**

Courage is almost a contradiction in terms. It means a strong desire to live taking the form of a readiness to die. It is a piece of everyday advice for sailors or mountaineers. Chesterton The paradox of courage is that a man must be a little careless of his life even in order to keep it. Each advance leaves him weaker as well as stronger. Lewis Power, if one examines it closely, shows itself to be a fiction. There is in its very essence a fundamental contradiction that prevents it from ever existing in the true sense of the word. But such is never the case. The instruments of power—arms, gold, machines, magical or technical secrets—always exist independently of him who disposes of them and can be taken up by others. Consequently all power is unstable. There never is power, but only a race for power. Simone Weil If everything is possible then nothing is possible. Nothing is possible for the self because it is the object that is possible. Absolute power is impotence. The less you have the more free you are. Man must choose to be rich in things or in the freedom to use them. Ivan Illich When market dependence reaches a certain threshold it deprives people of their power to live creatively and to act autonomously. And precisely because this new impotence is so deeply experienced, it is very difficult to express. Click to reach the associated topic for this webpage. For more topics click.

Chapter 6 : Fermi paradox - Wikipedia

The Mysterious Nature of Paradox As we established in the previous section, Chukat touches on those paradoxical matters that are beyond the boundaries of human reason. By its very nature paradox is inherently mysterious, and when deeply contemplated, forces us to develop pathways in our minds and souls that we hardly knew were there.

Enrico Fermi " The Fermi paradox is a conflict between the argument that scale and probability seem to favor intelligent life being common in the universe, and a total lack of evidence of intelligent life having ever arisen anywhere other than on the Earth. The first aspect of the Fermi paradox is a function of the scale or the large numbers involved: This assumes the mediocrity principle, by which the Earth is a typical planet. The second aspect of the Fermi paradox is the argument of probability: Since there is no significant evidence on Earth, or elsewhere in the known universe, of other intelligent life after Some examples of possible resolutions are that intelligent life is rarer than we think, that our assumptions about the general development or behavior of intelligent species are flawed, or, more radically, that our current scientific understanding of the nature of the universe itself is quite incomplete. The Fermi paradox can be asked in two ways. Since there are many stars older than the Sun, and since intelligent life might have evolved earlier elsewhere, the question then becomes why the galaxy has not been colonized already. Even if colonization is impractical or undesirable to all alien civilizations, large-scale exploration of the galaxy could be possible by probes. These might leave detectable artifacts in the Solar System, such as old probes or evidence of mining activity, but none of these have been observed. The second form of the question is "Why do we see no signs of intelligence elsewhere in the universe? For distant galaxies, travel times may well explain the lack of alien visits to Earth, but a sufficiently advanced civilization could potentially be observable over a significant fraction of the size of the observable universe. It is unknown whether the paradox is stronger for our galaxy or for the universe as a whole. The conversation shifted to other subjects, until during lunch Fermi suddenly exclaimed, "Where are they? An earlier implicit mention was by Konstantin Tsiolkovsky in an unpublished manuscript from Therefore, he proposed what is now known as the zoo hypothesis and speculated that mankind is not yet ready for higher beings to contact us. Hart published in a detailed examination of the paradox, [9] which has since become a theoretical reference point for much of the research into what is now sometimes known as the Fermi-Hart paradox. Landis prefers that name on the grounds that "while Fermi is credited with first asking the question, Hart was the first to do a rigorous analysis showing that the problem is not trivial, and also the first to publish his results". Gray argues that the term Fermi paradox is a misnomer, since in his view it is neither a paradox nor due to Fermi; he instead prefers the name Hart-Tipler argument, acknowledging Michael Hart as its originator, but also the substantial contribution of Frank J. Drake equation The theories and principles in the Drake equation are closely related to the Fermi paradox. The speculative equation considers the rate of star formation in the galaxy; the fraction of stars with planets and the number per star that are habitable; the fraction of those planets that develop life; the fraction that develop intelligent life; the fraction that have detectable, technological intelligent life; and finally the length of time such communicable civilizations are detectable. The fundamental problem is that the last four terms are completely unknown, rendering statistical estimates impossible. The Drake equation has been used by both optimists and pessimists, with wildly differing results. The first scientific meeting on the search for extraterrestrial intelligence SETI, which had 10 attendees including Frank Drake and Carl Sagan, speculated that the number of civilizations was roughly equal to the lifetime [non sequitur] in years, and there were probably between 1, and ,, civilizations in the Milky Way galaxy. Barrow used pessimistic numbers and speculated that the average number of civilizations in a galaxy is much less than one. An analysis that takes into account some of the uncertainty associated with this lack of understanding has been carried out by Anders Sandberg, Eric Drexler and Toby Ord, [35] and suggests that with very high probability, either intelligent civilizations are plentiful in our galaxy or humanity is alone in the observable universe, with the lack of observation of intelligent civilizations pointing towards the latter option. Great Filter The Great Filter, in the context of the Fermi paradox, is whatever prevents "dead matter" from giving rise, in time, to expanding, lasting life according to

the Kardashev scale. Other proposed great filters are the emergence of eukaryotes or of meiosis or some of the steps involved in the evolution of a brain capable of complex logical deductions. This includes both efforts to find any indication of life, [38] and efforts specifically directed to finding intelligent life. These searches have been made since , and several are ongoing. For example, pulsars , when first discovered in , were called little green men LGM because of the precise repetition of their pulses. The careful searching for non-natural radio emissions from space may lead to the detection of alien civilizations. In the absence of an apparent natural cause, alien observers might infer the existence of a terrestrial civilization. It should be noted however that the most sensitive radio telescopes currently available on Earth would not be able to detect non-directional radio signals even at a fraction of a light-year , so it is questionable whether any such signals could be detected by an extraterrestrial civilization. Such signals could be either "accidental" by-products of a civilization, or deliberate attempts to communicate, such as the Arecibo message. A number of astronomers and observatories have attempted and are attempting to detect such evidence, mostly through the SETI organization. Several decades of SETI analysis have not revealed any unusually bright or meaningfully repetitive radio emissions. Large-scale artificial lighting produced by human civilization is detectable from space. Such observational refinements may allow us to better gauge how common potentially habitable worlds are. Von Neumann probe and Bracewell probe Self-replicating probes could exhaustively explore a galaxy the size of the Milky Way in as little as a million years. Another speculation for contact with an alien probeâ€”one that would be trying to find human beingsâ€”is an alien Bracewell probe. Such a hypothetical device would be an autonomous space probe whose purpose is to seek out and communicate with alien civilizations as opposed to Von Neumann probes, which are usually described as purely exploratory. These were proposed as an alternative to carrying a slow speed-of-light dialogue between vastly distant neighbors. Rather than contending with the long delays a radio dialogue would suffer, a probe housing an artificial intelligence would seek out an alien civilization to carry on a close-range communication with the discovered civilization. The findings of such a probe would still have to be transmitted to the home civilization at light speed, but an information-gathering dialogue could be conducted in real time. Detailed exploration of areas of the Solar System where resources would be plentiful may yet produce evidence of alien exploration, [53] [54] though the entirety of the Solar System is vast and difficult to investigate. Dyson sphere , Kardashev scale , Alderson disk , Matrioshka brain , and Stellar engine A variant of the speculative Dyson sphere. Such large scale artifacts would drastically alter the spectrum of a star. In , Freeman Dyson observed that every developing human civilization constantly increases its energy consumption, and, he conjectured, a civilization might try to harness a large part of the energy produced by a star. He proposed that a Dyson sphere could be a possible means: Such a feat of astroengineering would drastically alter the observed spectrum of the star involved, changing it at least partly from the normal emission lines of a natural stellar atmosphere to those of black body radiation , probably with a peak in the infrared. Dyson speculated that advanced alien civilizations might be detected by examining the spectra of stars and searching for such an altered spectrum. Rare Earth hypothesis Those who think that intelligent extraterrestrial life is nearly impossible argue that the conditions needed for the evolution of lifeâ€”or at least the evolution of biological complexity â€”are rare or even unique to Earth. Under this assumption, called the rare Earth hypothesis , a rejection of the mediocrity principle , complex multicellular life is regarded as exceedingly unusual. No other intelligent species have arisen[edit] It is possible that even if complex life is common, intelligence and consequently civilizations is not. This is sometimes referred to as the "algae vs. Along with non-intelligent life, such civilizations would be also very difficult for us to detect, [68] short of a visit by a probe, a trip that would take hundreds of thousands of years with current technology. This is the argument that technological civilizations may usually or invariably destroy themselves before or shortly after developing radio or spaceflight technology. Possible means of annihilation are many, [71] including war, accidental environmental contamination or damage, resource depletion, climate change , [72] or poorly designed artificial intelligence. This general theme is explored both in fiction and in scientific hypothesizing. Technological singularity and Von Neumann probe Another hypothesis is that an intelligent species beyond a certain point of technological capability will destroy other intelligent species as they appear. The idea that something , or someone, might be destroying intelligent life in the universe has been explored in

the scientific literature. In , cosmologist Edward Harrison argued that such behavior would be an act of prudence: These are thought to have been caused by events such as impact from a large meteorite, massive volcanic eruptions, or astronomical events such as gamma-ray bursts. This hypothesis uses the synchronous gauge probability distribution, with the result that young universes exceedingly outnumber older ones by a factor of e for every second of age. Therefore, averaged over all universes, universes with civilizations will almost always have just one, the first to develop. However, Guth notes "Perhaps this argument explains why SETI has not found any signals from alien civilizations, but I find it more plausible that it is merely a symptom that the synchronous gauge probability distribution is not the right one. Human searches may be able to detect their existence, but communication will remain impossible because of distance. In this case at least one partner in the exchange may obtain meaningful information. Alternatively, a civilization may simply broadcast its knowledge, and leave it to the receiver to make what they may of it. It is also possible that archaeological evidence of past civilizations may be detected through deep space observations. This is a tiny fraction of the lifespan of a galaxy under ordinary assumptions and calculations resulting from them, so the likelihood that we are in the midst of this transition is considered low in the paradox. Project Daedalus , Project Orion nuclear propulsion , and Project Longshot Many speculations about the ability of an alien culture to colonize other star systems are based on the idea that interstellar travel is technologically feasible. While the current understanding of physics rules out the possibility of faster-than-light travel, it appears that there are no major theoretical barriers to the construction of "slow" interstellar ships, even though the engineering required is considerably beyond our present capabilities. This idea underlies the concept of the Von Neumann probe and the Bracewell probe as a potential evidence of extraterrestrial intelligence. It is possible, however, that present scientific knowledge cannot properly gauge the feasibility and costs of such interstellar colonization. Theoretical barriers may not yet be understood, and the resources needed may be so great as to make it unlikely that any civilization could afford to attempt it. Even if interstellar travel and colonization are possible, they may be difficult, leading to a colonization model based on percolation theory. Colonization may thus occur in "clusters," with large areas remaining uncolonized at any one time. This leads to little or no physical travel at the current epoch, and only directed communications, which are hard to see except to the intended receiver. The whole period of modern human existence to date is a very brief period on a cosmological scale, and radio transmissions have only been propagated since Thus, it remains possible that human beings have neither existed long enough nor made themselves sufficiently detectable to be found by extraterrestrial intelligence. Extraterrestrials might, for example, transmit signals that have a very high or low data rate, or employ unconventional in our terms frequencies , which would make them hard to distinguish from background noise. Signals might be sent from non- main sequence star systems that we search with lower priority; current programs assume that most alien life will be orbiting Sun-like stars. A signal is much easier to detect if the signal energy is limited to either a narrow range of frequencies, or directed at a specific part of the sky. Such signals could be detected at ranges of hundreds to tens of thousands of light-years distance. Many SETI searches assume that extraterrestrial civilizations will be broadcasting a deliberate signal, like the Arecibo message, in order to be found. Thus to detect alien civilizations through their radio emissions, Earth observers either need more sensitive instruments or must hope for fortunate circumstances: Civilizations broadcast detectable radio signals only for a brief period of time[edit] It may be that alien civilizations are detectable through their radio emissions for only a short time, reducing the likelihood of spotting them. The usual assumption is that civilizations outgrow radio through technological advancement. Such uses may remain visible even after broadcast emission are replaced by less observable technology. Some scientists have hypothesized that advanced civilizations may send neutrino signals. Once any sufficiently advanced civilization becomes able to master its environment, and most of its physical needs are met through technology, various "social and entertainment technologies", including virtual reality, are postulated to become the primary drivers and motivations of that civilization. SETI â€” the Search for Extraterrestrial Intelligence Another possibility is that human theoreticians have underestimated how much alien life might differ from that on Earth. Aliens may be psychologically unwilling to attempt to communicate with human beings. Perhaps human mathematics is parochial to Earth and not shared by other life, [] though others argue

this can only apply to abstract math since the math associated with physics must be similar in results, if not in methods. Carl Sagan speculated that an alien species might have a thought process orders of magnitude slower or faster than ours. Another thought is that technological civilizations invariably experience a technological singularity and attain a post-biological character. Zoo hypothesis Schematic representation of a planetarium simulating the universe to humans.

Chapter 7 : The Nature of The Jevons Paradox : LA IMC

So to be able to clearly see and appreciate the ambiguity and contradictory nature of everything around us gives us a much deeper understanding and appreciation of others. Here are 5 interesting examples of paradox I've picked up on in human behavior.

Though they have all been resolved, they remind us just how weird the universe really is. It is a dream from which we will never wake up. But who would want to? This simple question is the crux of a paradox first posed by the ancient Greek philosopher Zeno, and it has made generations of math students question the nature of reality every time they walk across a room. Say you want to walk down the hallway from your bedroom to your bathroom. First, you have to cover half the distance between the rooms. As you continue down the hall, you will always have half the previous distance left to cross. Though you will move ever closer to the threshold of the bathroom door, you will never actually reach it. The answer is at the heart of calculus: It turns out that infinitely long sequences of numbers can actually have finite sums. Is space—or spacetime—continuous, or is it broken up into discrete chunks? It could be subdivided into smaller pieces on and on into infinity. If you split a cookie in half over and over again as many guilty sweet-tooths have no doubt tried at home you will eventually be left with the indivisible components electrons and quarks of one atom. This is also the moral of the story of quantum mechanics: The energy contained in all the particles that make up the universe is quantized. Why should spacetime be any different? In fact, some of the leading theories of quantum gravity predict that, on the tiniest scales, spacetime should break down into discrete chunks. Like a pointillist painting, spacetime may look perfectly smooth from afar, but up close it dissolves into pixels. There are currently experiments in the works to test this prediction. Everyone from Einstein to Edgar Allan Poe was swept up by this apparently simple puzzle. If the universe is infinite, argued Kepler, containing an infinite number of stars distributed evenly across the sky, then every point on the night sky should be illuminated by starlight. The brightness of any individual star, as seen from Earth, fades in proportion to the square of its distance from Earth, but the number of stars at a given distance from Earth increases in proportion to the square of the distance from Earth, so it is a wash. The night sky, therefore, should be just as bright as the daylight sky. To Kepler, this meant that the universe must not be infinite after all. In , Heinrich Olbers drew up a different solution to the paradox that now bears his name. Olbers argued that as the light from each star makes its way toward Earth, it runs into interstellar dust and gas that absorb some its energy. This is where Poe enters the picture.

Chapter 8 : Paradoxal | Define Paradoxal at calendrierdelascience.com

A paradox is a statement that may seem absurd or contradictory but yet can be true, or at least makes sense. Paradoxes are often contrary to what is commonly believed and so play an important part in furthering our understanding in literature and everyday life, or they can simply be an entertaining brain teaser.

A paradox is a statement that may seem absurd or contradictory but yet can be true, or at least makes sense. Paradoxes are often contrary to what is commonly believed and so play an important part in furthering our understanding in literature and everyday life, or they can simply be an entertaining brain teaser. What is a Paradox? It is often easier to explain what a paradox is by giving examples. A paradox is used to challenge the mind and make you think about the statement in a new way. A paradox is often used to intrigue and question common thoughts. Take the statement "Less is more. How can less be more? The concept behind this statement is that what is less complicated is often more appreciated. Another well-known example of a paradox is the Liar paradox, which offers up the simple sentence: So the sentence is both true and not true at the same time. Some more examples of paradoxical statements are: You can save money by spending it. I know one thing; that I know nothing. This is the beginning of the end. Some examples of witty statements: Here are the rules: The second sentence is false. The first sentence is true. I only message those who do not message. Paradox in Literature Have a better idea of what a paradox is now? In doing so, examining their purpose will become an important part of the process. Clearly this statement does not make logical sense. However, the point of a paradox is to point out a truth, even if the statements contradict each other. Orwell is making a political statement here, but what? Perhaps it is that the government claims that everyone is equal when that is clearly false, or perhaps it is that individuals have skewed perceptions of what it means to be equal. The interpretation is up to the reader to decide. Orwell also uses a paradox in his novel " How can an individual convey kindness through evil? His mother is now married to Claudius, so, of course, this will be a tragedy for her. This statement uses death in two opposing ways. We clearly know that death is not a living thing and cannot die. But Donne is stating that he is showing mortality in this case. Paradox or Oxymoron It is common to confuse an oxymoron with a paradox. Both are found in literature as well as in everyday conversations. Here is the difference between the two: An oxymoron is a combination of two words that contradict each other. A paradox is a statement or group of sentences that seems to contradict the truth but is an implied truth. They describe an action or situation that seems absurd but yet can be true. An example that is frequently used to introduce the idea of a paradox is a "jumbo shrimp. However, this is an oxymoron, since the term is simply being used for dramatic effect. Another example of an oxymoron is the phrase "pretty ugly. This phrase is used as such: If something is called a "known secret", this is also an example of an oxymoron. A "secret" is not something made known to others. But in this case, it means something widely known to be true but not spoken of in public. Other examples of an oxymoron are the following words: A paradox is often used in everyday speech as well to criticize an idea in order to show its faults or to provoke a new thought. Paradoxes are also a fun concept that can add a witty element to a situation or writing. They are interesting or amusing statements that contradict common beliefs and are sure to add intrigue to whatever situation they are used in. YourDictionary definition and usage example.

Chapter 9 : Nature of Paradox - Oxford Scholarship

This is a list of paradoxes, grouped calendrierdelascience.com grouping is approximate, as paradoxes may fit into more than one category. This list collects only scenarios that have been called a paradox by at least one source and have their own article.