Augustine & 20th Century Physics

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Oct 8, 2002

Wheaton College Science Division Lunch

Why discuss philosophy? 5 Reasons

- **1:** I didn't want to bore you with a repeat of my July 25 talk.
- **2:** It is occupational hazard for middle-aged physicists, as an exasperated Richard Feynman reported. (Yup, I'm middle-aged.)
- **3:** Perhaps because physics, unlike chemistry or biology, seems to live closer to the edge of the cliff called measurement. So when physics pushes to the extremes of size, or time, or intensity, or whatever, it keep running smack into limits. And some of these are God-given limits. So l and behold, physicists end up talking about God. You can imagine how frustrating this becomes when it is the one subject physicists are traine *not* to talk about. But we must, so we should.
- **4:** The Intelligent Design movement (akin to Hugh Ross' approach) argues that a proper (not new!) philosophical approach is drastically needed in biology/chemistry in order for scientific progress to continu I argue this is true for Physics too.
- **5:** My 12-yr daughters were in tears when I attempted to explain QM an Relativity to them. "But God wouldn't make it that way!" they objected. "But He did", I replied. So Hannah & Bekah, this talk's for you.

Greek Philosophy: Plato / Aristotle

- Plato's Demi-Urge created the Universe from pre-existent matter.
- Aristotle's "First Mover" perhaps did not create the matter, but he set it in motio The necessity for this Creator in both philosophical systems, is bound up in the whole idea of Causation. (Of course, this is a deep subject, being the origin of Hume's skepticism, Kant's idealism and modern agnosticism, but it is a truly ancient conundrum Aristotle reproaches Materialists for missing the point. He feels that intelligence, *nous,* is required to explain purpose, which Materialists ignore.
- 4 Types of Causes: 1) Material; 2) Formal; 3) Efficient; and 4) Final.
- **Aristotle: Physics II.3:**
  - In one sense, what is described as a cause is that material out of which a thing comes into being and which remains present in it. Such, for instance, is bronze in the case of a statue, or silver in the case of a cup, as well the genera to which these materials belong.
  - In another sense, the form and pattern are a cause, that is to say the statement of the essence genera to which it belongs; such, for instance, in the case of the octave, are the ratio of two to one, and number in general; and th constituent terms in a definition are included in the wider class of a definition.
  - Then there is the initiating source of change or rest: the person who advises an action, for instance, is a cause o the action; the father is the cause of his child; and in general, what produces is the cause of what is changed.
  - Then there is what is a cause insofar as it is an end (telos): this is the purpose of a thing; in this sense, health, for instance, is the cause of a man's going for a walk. "Why," someone asks, "is he going for a walk?" "For the goo his health," we reply, and when we say this we think that we have given the cause of his doing so. All the intermediate things, too, that come into being through the agency of something else for this same end have this a their cause: slimming, purging, drugs, and surgical instruments--all have the same purpose, health, as their caus although they differ from each other in that some of them are activities, others are instruments.
- Thus causation REQUIRES a "first mover", a Creator. ==> "Proofs"

Epicurean(~400BC) materialism

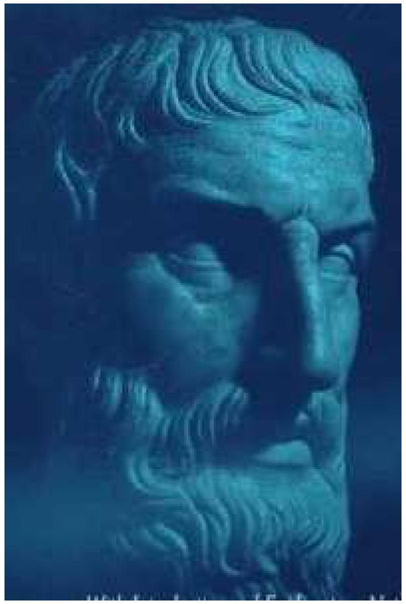
- **Democritus (~500 BC) & Leucippus (???)** preceded **Plato/Aristotle**, and attributed all senses and actions to atoms. By itself it seemed an odd thing to try to do, and Aristotle justly ridiculed But it was **Epicurus** who developed this Philosophy into an alternative to Aristotle/Plato's Creator. Why bother?

- Because belief in the pantheon of gods had ceased to be practical, produced onerous ethical laws, and destroyed what little enjoyment was attainable by human beings. As the old Scot put it *"Aye, religion won't keep a man from sinnin, but it will keep him from enjoyin it the rest of his life!"* This led to Epicurus' point: purpose was a bad thing, and to be avoided at all costs.
- Most of what these men wrote has been lost to us, but we do have a long Latin poem written by Titus **Lucretius** Carus (**100-50BC**), who, as the translater explains, "was a disciple before he was a poet", and who carefully framed Epicurean philosophy in a remarkable form, poetry. (Quick, somebody translate my scientific publications into verse!)
- His motive was clear, setting humans free from superstion, from religion and all the vic caused by them. In a word, atheism. We know well the consequences, for the epithet "epicurean" in the NT stood for all that was licentious, "eat, drink and be merry for tomorrow we die". Yet strangely, that was NOT the original point of the philosophy...

Lucretius(99-55 BC)*"De rerum natura"*

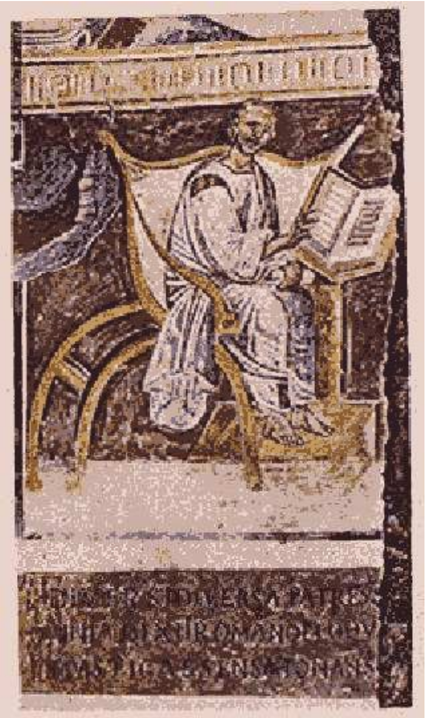
- [I:50ff]When human life lay grovelling in all men's sight, crushed to the earth under the dead weight of superstition whose grim features loured menacingly upon mortals from the four quarters of the sky, a man of Greece was first to raise mortal eyes in defiance, first to stand erect and brave the challenge. Fables of the gods did not crush him, no the lightning flash and the growling menace of the sky. Rather, they quickened his manhood, so that he, first of all men, longed to smash the constraining locks of nature's doors. The vital vigour of his mind prevailed. He ventured f out beyond the flaming ramparts of the world and voyaged in mind throughout infinity. Returning victorious, he proclaimed to us what can be and what cannot; how a limit is fixed to the power of everything and an immovable frontier post. Therefore superstition in its turn lies crushed beneath his feet, and we by his triumph are lifted level wi the skies. One thing that worries me is the fear that you may fancy yourself embarking on an impious course, setting your feet on the path of sin. Far from it. More often it is this very superstition that is the mother of sinful and impious deeds. Remember...Iphigeneia...Such are the heights of wickedness to which men are driven by superstition.

- [I:150ff]This dread and darkness of the mind cannot be dispelled by the sunbeams, the shining shafts o day, but only by an understanding of the outward form and inner workings of nature. In tackling this theme, our starting point will be this principle: Nothing can ever be created by divine power out of nothing The reason why all mortals are so gripped by fear is that they see all sorts of things happening on the earth and in the sky with no discernible cause, and these they attribute to the will of a god. Accordingly when we have seen that nothing can be created out of nothing, we shall then have a clearer picture of the path ahead, the problem of how things are created and occasioned without the aid of the gods....E if I knew nothing of the atoms, I would venture to assert on the evidence of celestial phenomena themselves, supported by many other arguments, that the universe was certainly not created for us by divine power; it is so full of imperfections.
- [I:220ff] The second great principle is this: nature resolves everything into its component atoms and never reduces anything to nothing. If anything were perishible in all its parts, anything might perish all o a sudden and vanish from sight.
- [II:1080ff] Bear this well in mind, and you will immediately perceive that nature is free and uncontrolled by proud masters and runs the universe by herself without the aid of the gods.



More Lucretius...

- **On Magnets:** At this point, I will set out to explain what law of nature causes iron to be attracted by that stone which the Greeks call from its place of orgin magnet, because i occurs in the territory of the Magnesians. Men look upon this stone as miraculous. They are amazed to see it form a chain of little rings hanging from it. Sometimes you may see a many as five or more in pendent succession swaying in the light puffs of air; one hangs from another, clinging to it underneath, and one derives from another the cohesive force the stone.... First, this stone must emit a dense stream or emanation of atoms, which dispe by a process of bombardment all the air that lies between a stone and the iron. When this space is emptied and a large tract in the middle is left void, then atoms of the iron all tangled together immediately slide and tumble into the vacuum. The consequence is that the ring itself follows and so moves in with its whole mass.
- **On teleology in biology:** In this context, there is one illusion that you must do your level best to escape--an error to guard against with all your foresight. You must not imagine that the bright orbs of our eyes we created purposely, sot that we might be able to look before us...To interpret these or any other phenomenon on th lines is perversely to turn the truth upside down. In fact, nothing in our bodies was born in order that we might be able to use it, but the thing born creates the use. There ws no seeing before eyes were born, no talking before the tongue was created. The orgin of the tongue was far anterior to speech. The ears were created long before a sou was heard...Here, then, is proof upon proof that you must banish the belief that they could have been created for purpose of performing particular functions.
- **On love:** If you find yourself thus passionately enamoured of an individual, you should keep well away from such images. Thrust from you anything that might feed your passion, and turn your mind elsewhere. Vent the see love upon other objects. By clinging to it you assure yourself the certainty of heart-sickness and pain. With nourishment the festering sore quickens and strengthens. Day by day the frenzy heightens and the grief deepens Your only remedy is to lance the first wound with new incisions; to salve it, while it is still fresh, with promiscuous attachments; to guide the motions of your mind into some other channel. Do not think that by avoiding grand passions you are missing the delights of Venus. Rather, you are reaping such profits as carry with them no penal
- **On Darwin:** As Matthew Arnold said of Darwin in 1869, "Why it's all in Lucretius."



Augustine(354-430) & Materialism

- Augustine was trained in philosophy before becoming Bishop of Hippo. Thus his careful exposition of Genesis was undoubtedly intended to counter the errors he saw in Greek philosophy, especially as they appeared in the "new age" Manichean sect. In particular I focus on his philosophy/theology of Genesis, of beginnings:

  1) time-and-space creation

  2) creatio ex nihilo

  3) contingent creation

- Each of these statements were intended, I believe, to counteract and oppose Epicurean materialism. Each is extremely relevant for scientists today who attempt "integration of fai & learning". For today, the pre-eminent philosophy of science (yes Virginia, there is a philosophy of science) has been called *naturalism*, or *scientific materialism*, with a great debt to the ancient Greeks. This was the philosophy that bore the brunt of 20th century physics. Yet 1500 years ago, Augustine undercut the very foundations of materialism so effectively, that materialism went underground for 1000 years. So the correlation between Augustine & modern physics is more than remarkable, it is miraculous.
- The place that Augustine develops this argument is surprising, its in his *Confessions*. I discovered this fact when I went tracking down his phrase *ex nihilo*. Now the first 10 chapters were autobiographical, but 11-13 are confusingly philosophical.

1) The creation of time

- 11.14. How, then, shall I respond to him who asks, "What was God doing before he made heaven and earth?" I do not answer, as a certain one is reported to have done facetiously (shrugging off the force of the question). "He was preparing hell," he said, "for those who pry too deep." It is one thing to see the answer; it is another to laugh a the questioner--and for myself I do not answer these things thus. More willingly would have answered, "I do not know what I do not know," than cause one who asked a deep question to be ridiculed--and by such tactics gain praise for a worthless answer.
- 11.15. But if the roving thought of someone should wander over the images of past time, and wonder that thou, the Almighty God, the All-creating and All-sustaining, the Architect of heaven and earth, didst for ages unnumbered abstain from so great a wo before thou didst actually do it, let him awake and consider that he wonders at illusion For in what temporal medium could the unnumbered ages that thou didst not make pass by, since thou art the Author and Creator of all the ages? Or what periods of tim would those be that were not made by thee? Or how could they have already passed away if they had not already been? Since, therefore, thou art the Creator of all times, there was any time before thou madest heaven and earth, why is it said that thou wa abstaining from working? For thou madest that very time itself, and periods could not pass by before thou madest the whole temporal procession. But if there was no time before heaven and earth, how, then, can it be asked, "What wast thou doing *then*?" For there was no "*then*" when there was no time.

2) Creatio ex nihilo

- 12.3. And truly this earth was invisible and unformed, and there was an inexpressibly profound abyss above which there was no light since it had no form. Thou didst command it written that "darkness was on the face of the deep." ... Hast thou not, O Lord, taught this soul which confesses to thee? Hast thou not thus taught me, O Lord, that before thou didst form and separate this formless matter there was nothing: neither color, nor figure, nor body, nor spirit? Yet it was not absolutely nothing; it was a certain formlessness without any shape.
- 12.7 Thus it was that thou, O Lord, who art not one thing in one place and another thir in another place but the Selfsame, and the Selfsame, and the Selfsame--"Holy, Holy, Holy, Lord God Almighty"--thus it was that in the beginning, and through thy Wisdom which is from thee and born of thy substance, thou didst create something and that out of nothing. For thou didst create the heaven and the earth--not out of thyself, for then they would be equal to thy only Son and thereby to thee. And there is no sense in whi it would be right that anything should be equal to thee that was not of thee. But what else besides thee was there out of which thou mightest create these things, O God,on Trinity, and trine Unity? And, therefore, it was out of nothing at all that thou didst creat the heaven and earth--something great and something small--for thou art Almighty anc Good, and able to make all things good: even the great heaven and the small earth. Thou wast, and there was nothing else from which thou didst create heaven and earth these two things, one near thee, the other near to nothing; the one to which only thou art superior, the other to which nothing else is inferior.

3) The contingency of creation

- 13:2 Indeed, it is from the fullness of thy goodness that thy creation exists at all: to the end that the created good might no fail to be, even though it can profit thee nothing, a is nothing of thee more equal to thee--since its created existence comes from thee. Fo what did the heaven and earth, which thou didst make in the beginning, ever deserve from thee? Let them declare--these spiritual and corporeal entities, which thou madest thy wisdom--let them declare what they merited at thy hands, so that the inchoate and the formless, whether spiritual or corporeal, would deserve to be held in being in spite o the fact that they tend toward disorder and extreme unlikeness to thee?
- 13:5 What, therefore, would there have been lacking in thy good, which thou thyself ar even if these things had never been made or had remained unformed? Thou didst not create them out of any lack but out of the plenitude of they goodness, ordering them and turning them toward form, but not because thy joy had to be perfected by them. F thou art perfect, and their imperfection is displeasing. Therefore were they perfected by thee and became pleasing to thee--but not as if thou wert before that imperfect and ha to be perfected in their perfection. For thy good Spirit which moved over the face of th waters was not borne up by them as if he rested on them.

Augustine's victory

- **Materialism** in every form is denied (Plato's demi-urge too) because the Creator is affirmed/ proved/ demonstrated by His creation. Note the attack comes at the root of materialism, not the branches or the fruit, e.g., materialis is wrong not because of its excesses, but because of its essences. (n.b. the trinitarian 3 last chapters of *Confessions*)
  - **Existence/Eternal/Father:** The universe had a beginning. Only God did not. It was an absolute beginning. Not just matter was created but space & time itself. (A radical view of time!)
  - **Knowledge/Begotten/Son:** Therefore matter is not eternal. God created it out of nothing. There is no other substance from which He created. He spoke, and it was so. Matter exists at His bidding, and matter vanishes too
  - **Will/Contingency/Spirit:** Matter, space and time were created and remai in existence at His bidding. They are not necessary, nor independent but rather are contingent, dependent, reliant on His Spirit. The creation did nc require God, shape God or inform God, but is the very expression of His will, His personality, His purpose, now and forevermore.
- With the triumph of the Church, and the resulting renaissance of science (see Jaki), materialism didn't resurface for 1000 years. But whe it did, the Church had a fight on its hands...

Pierre Gassendi (1592-1655)

- Pierre Gassendi (the "Bacon of France") attended school at Digne from 1599 to 16 then continued his education at home supervised by his uncle. Then, in 1608, he entered the University of Aix where he studied philosophy for two years then theolo for a further two years. Gassendi was Principal at the College of Digne from 1612 to 1614, then he received a doctorate in theology from Avignon and was ordained in 1615, one year later. He had already been appointed canon at a church in Digne i 1614. He held this post until 1634 when he was elevated to dean.
- In addition Gassendi was appointed professor of philosophy at the University of Aix in 1617. However this position only lasted until 1623 when the Jesuit order took contr of the university of Aix and he was forced to leave. He did not hold any further academic posts until 1645 when he was appointed professor of mathematics at the Collège Royale in Paris. He was the first to observe a transit of Mercury predicted by Kepler to occur in 1631. He wrote on astronomy, his own astronomical observations and on falling bodies.
- Gassendi published on philosophy. His first work was *Exercitationes paradoxicae* (1624), basically his lecture course at Aix written up for publication. In 1649 he published *Animadversiones* containing work on Epicurus. His *Philosophical Treatise*
- He was responsible for making atomism respectable in European intellectual circles of the 17th century Atomism derived from Greek philosophers, was transmitted and modified by Lucretius and Epicurus. In Epicurean form atomism was incompatible with Christianity. Gassendi made atomism respectable by modifying it so that it did not conflict with Christianity. Thus, instead of insisting on the eternity of atoms Gassendi has God create the atoms.
- Connected with his efforts to make atomism respectable was his rejection of Aristotelianism. There was, from the Renaissance on, a revolt against Aristotelian philosophy. Many of the philosophers of the 17t century were part of this revolt. Aristotle had rejected atomism, and this gives Gassendi some reason t reject Aristotle (as did many other philosophers of the Enlightenment.)
- He advocated a moderate skepticism (inductive method vs. Descartes deductive), viewing both as probabilistic.

James Clerk-Maxwell (1831-79), John Tyndall (1820-93) & Ludwig Boltzmann (1844 -1906)

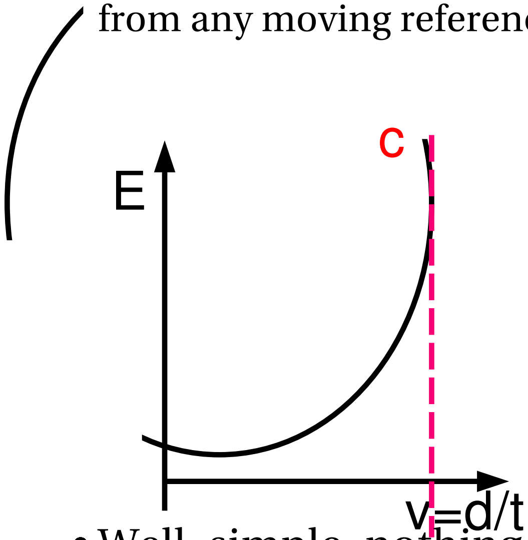
- In 1872 when **Maxwell** lectured at the British Association for the Advancement of Science on the subject of atomism in physics, it was considered a relatively novel physics idea, which Maxwell was at pains to showcase its advantages, having derived some important properties of gases that depended upon treating gases as atoms. Maxw was a Scottish presbyterian, who was not unaware of the bad press that attended atomism and materialism.
- *"They [atoms] continue this day as they were created, perfect in number and measure and weight, and from the ineffaceable characters impressed on them we may learn that those aspirations after accuracy in measurement, truth statement, and justice in action, which we reckon among our noblest attributes as men, are ours because they are essential constituents of the image of Him Who in the beginning created, not only the heaven and the earth, but the materials of which heaven and earth consist."*
- How then did Maxwell solve the problem of Augustine's rejection of atomism and materialism?
- *"Science is incompetent to reason upon the creation of matter itself out of nothing. We have reached the utmost limit of our thinking faculties when we have admitted that because matter cannot be eternal and self-existent it must have be created."*
- Like most Deists, Maxwell places the action of God at the "utmost limit" of science, or deliberate agnosticism.
- In 1874, **Tyndall** gave a talk in Belfast for BAS that raised the ire of preachers all across Ireland. The theme of the lecture was similar to Maxwell's, a short history of materialism and atomism, but the conclusion was far different. Perhaps his most famous quote that day was:
- *We claim, and we shall wrest from theology, the entire domain of cosmological theory.*
- The battle had been joined, ardent religion vs. lukewarm agnosticism. And Materialism won hands down.
- No one doubts that it was **Boltzmann** who put the atomic theory of matter on concrete physical and mathematical foundations, founding the discipline of "statistical mechanics". If you read Maxwell's lecture to the BAS in 1872, yo will read a who's-who of 19th century scientists, with some grudging admiration of the man who in the first 5 years after his doctorate "greatly developed and improved" upon Maxwell's own work on atoms--Boltzmann. By calculati the dynamics of single atoms, he was able to show very precisely the heat capacity, pressure and similar relations which derived from these quantities. In short, Boltzmann was able to take an empirical theory of heat, and place it c firm physical foundations, assuming that atoms exist.
- What happened to these men? Maxwell died at 48. Tyndall died of an overdose of sleep medication. Boltzmann hu himself. **Materialism carries its price, known full well to these early apostles of the scientific religion.**

Augustine redux

- We now see a problem with Augustine's critique. It was all or nothing. (Remember Elijah Mt Carmel?) Either the foundations of materialism were wrong, or Augustine's hermeneut was wrong. And if Augustine was wrong, he was really, really wrong.
- The successes of atomism were at first carefully construed not to lend any support to materialism. Augustine was sheltered, as it were, by **Kant**'s wall of separation between the *noumena* and the *phenomena*. But alas, all such scholasticism provided little resistance to the blitzkrieg of materialism. Some, like **GK Chesterton**, artfully railed against the nihilism inherent in materialism. **CS Lewis** passionately argued for the *nous* of **Aristotle. Fyodor Dostoevsky** painted vividly the ethical destruction of materialism. And on and on it went, but all of these brush fires did little damage to the root. Either the world is nothing but particles, or it is nothing but God. Half-measures in philosophy were as meaningful as bei half-pregnant or half-damned.
- In consequence, most theologians like **K Barth** escaped into the Kantian ghetto, swearing off any odor of science in the halls of theology. Strict separation was the only way for fait to survive in the wasteland of materialism. Fundamentalists, liberals, biblicists, unitarians, deists, all huddled together for support in the shrinking ghetto. For the ghetto was growin smaller as the panzers of progress moved in and the claims of materialism reached to th skies. First chemistry, then physics, then biology and even cosmology fell like dominos. Science was now not just incommensurate with faith, it was inimical to faith.
- **The worst nightmares of Chesterton, Lewis, Barth, (and Ted Kaczynski) all came true in the 20th century, but simultaneously, something really amazing happened.**

Einstein's Special Theory of Relativity or The Death of Matter

- **Einstein was convinced that physics should look the same in every inertial reference frame.** Several people before Einstein had explored the strange and wonderful postulate that the speed of light was a constant (Poincare, Lorentz), but it was to Einstein's credit that he believed it. To make a speed constan from any moving reference frame requires that we "squish" space, and "stretch" time.



Traditionally, books on relativity talk about the Michelson-Morley experiment which could find no evidence of the "ether", the medium in which light waves, "wave". Another argument is closer to home. A simple computer monitor accelerates electrons to an appreciable fraction of the speed of light. When the electron gun modulates (to, say, place a period at the end of a sentence) we can measure the time before the period appears, and with the width of the picture tube, find v. Now everyone graduates from freshman physics knowing that E=1/2 mv^2. But as we raise the voltage in the electron gun, we find that the velocity reaches a fixed number & never increases. How can that be?

- Well, simple, nothing travels faster than the speed of light, c.
- So where does the energy go, if it doesn't go into speed? It must go into the mass. So there this "normal mass" and then there's this "relativistic mass". So mass is related to energy.
- In a 2 page paper, published a few months after his 1905 bombshell, entitled "Does the inertia of a body depend on its energy content?", Einstein derives this result for light, and says m = E/c^2, (nope, he never said E=mc^2). His penultimate sentence suggests that th may account for radioactivity. The rest, they say, is history--Trinity, Hiroshima...
- But the bombshell for materialists was that matter, that indestructible, particulate, ubiquitous, heavy stuff, having real inertia, was as ephemeral as a sunbeam. Particles cou be created out of a vacuum, and could annihilate and vanish into the vacuum.

Can mass-energy replace matter?

- If matter is not conserved, but energy is, then can we instead argue that a new form of materialism can be constructed from the ashes of the old?
- I see at least 2 problems with this approach:
  - **1:** The Heisenberg Uncertainty Principle tells us that dE*dt = h, so that for very brief moments, neither energy nor mass is conserved, separately or together. Thus the vacuum of interstellar space is alive with the swarming of virtual particles appearing and disappearing. In cosmology, there is a search for the "dark matter" that makes spacetime appear flat (or normal). Approximately 2/ of the stuff that produces gravity is now thought to be "not baryonic", e.g. not matter. No one has a clue what is making gravity out there. Many kooks, and some geniuses (in an unknown ratio) are arguing for tapping into this vacuum energy. Can anyone reasonably argue for a conservation law when one doesn't even know what it is being conserved?
  - 2: Some very serious proponents of variants to the big-bang theory (which we discuss next) of the origin of the universe, argue that the energy of the big bang was extracted from gravity, such that the negative energy of gravity exactly balanced the "baryonic" energy of the big bang. Which is to say, the total mass-energy of the universe = 0. If that's a conservation law, then we'd all better be investing in dot-coms.
- Present Conservation Laws make materialism look very fishy.

Einstein's General Relativity or The Beginning of Time

- As Einstein himself realized, the special theory of relativity was incomplete. It could only handle systems that were moving in a straight line a fixed speed. It could neither handle rotating object nor the transition from rest to a high speed. Somehow the theory had to be generalized to take into account acceleration. The key, a in his earlier theory, was recognizing that physics in all trains mu be alike, so physics in elevators was all alike.

- If a light beam enters the side of the accelerating elevator (artificial gravity), it will appear to bend. Thus the stationary elevator on earth, which feels gravign should see light bend too. 1919 eclipse proved him right.

- If light bends due to gravity, AND light takes the shortest route between objects (Fermat' hypothesis) THEN a bent route IS the shortest, and space-time might be said to be warped by gravity. This conveniently explains Newton's "gravitational force field". However, and here Einstein was embarassed by his contemporaries such as Friedman, this means the universe should be "bent inward" by gravity and collapse. Newton had tl same problem.
- The solution was to posit that the Universe was "exploding" just enough to compensate for gravity pulling in. But then there had to be an explosion. A beginning. Of spacetime.

Can the Big Bang NOT=Genesis?

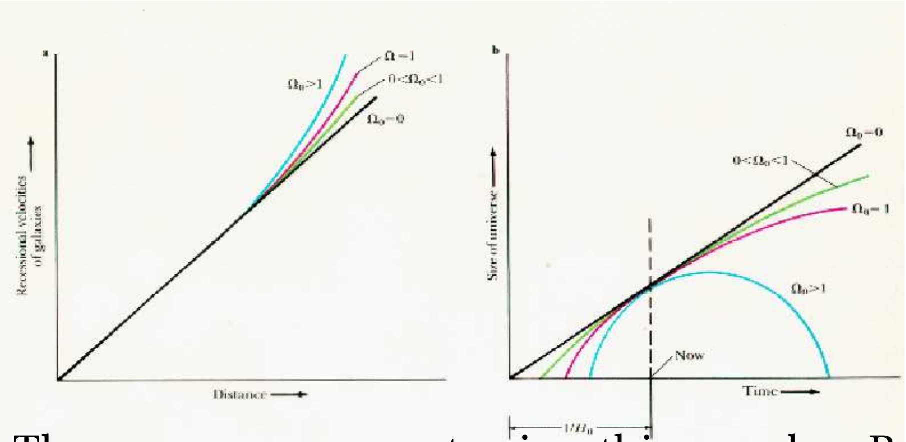
- In 1951, Pope Pius XII announced that '*everything seems to indicate that the universe has in finite times a mighty beginning*'. He went on to claim that unprejudiced scientific thinking indicated that the universe a *work of creative omnipotence, whose power set in motion by the mighty fiat pronounced billions of year ago by the Creating Spirit, spread out over the universe.* He took a lot of heat for this. But in 1965, Penzias and Wilson made the clinching discovery of "Big Bang radiation" cooled to 3 degrees above absolute zer Can we avoid this conclusion?
- **Method 1:**(Hoyle)*Unlike the modern school of cosmologists, who in conformity with Judaeo-Christian theologians believe the whole universe to have been created out of nothing, my beliefs accord with those of Democritus who remarked "Nothing is created out of nothing".* The universe really is time stationary, because matter is appearing out of the vacuum and filling in the "empty" regions. Experimentally disproven. Before his death last year, Hoyle became a Christian.
- **Method 2:**(Russians) The universe didn't collapse to a point, but merely "necked down" to an hourglass shape, like focussing light with spherical aberration. E.g, when we look backward in time, the galaxies "ju missed" colliding and thus the big bang was not a beginning at all.
- Stephen Hawking, with his advisor, Roger Penrose, proved that the Big Bang looked a lot like a Black Ho only time-reversed. Thus just as a star that is collapsing into a Black Hole reaches a point of no return, so the time-reversed Big Bang reaches a point of no return, so that all the galaxies emerged from a single point. That is Hawking proved the Big Bang really was a beginning of both space and time.
- **Method 3:**Well, perhaps the Big Bang was the Big Bounce? Theoretical hogwash. The big bang was a singularity. No knowlege of time before the singularity is possible. Nor would a bounce conserve entrop
- **Method 4:**(Hawking) Could Quantum uncertainty take the point off " The beginning"? Carl Sagan write in his introduction to Hawking's 1987 book, *This is also a book about God--or perhaps about the absence o God. Hawking embarks on a quest to answer Einstein's famous question about whether God had any cho in creating the universe. Hawking is attempting, as he explicitly states, to understand the mind of God. A this makes all the more unexpected the conclusion of the effort, at least so far: a universe with no edge in space, no beginning or end in time and nothing for a Creator to do.*
- If one had a roofing nail the size of the universe, Hawking's hypothesis dulls the point of that nail by less than the diameter of an atom, less than a proton, and yet claims to have removed the point! (Hawking subsequently divorced his Christian wife.)

2 views: Robert Jastrow & Paul Davies

- Other than the Pope, not too many people gave much thought to the revolution wrought by Einstein's two discoveries. But scientists were bothered. Robert Jastrow (a respected Harvard astronomer) 19781 "God and the Astronomers" has this famous quote: *For the scientist who has lived by his faith in the power of reason, the story ends like a bad dream. He has scaled the mountains of ignorance; he is about to conquer the highest peak; as he pulls himself over the final rock, he is greeted by a band of theologians who have been sitting there for centuries.* On matters of faith, Jastrow professes agnosticism, a liberty taken by the christian Maxwell, now claimed by the post-christian scientist. Like Maxwell, it will prove a brief freedom.
- Paul Davies wrote a far more scathing attack in his 1984 book "God and the New Physics" in which he attempts to address these issues without giving any quarter to Christianity, which he attacks for being mean-spirited, narrow-minded, and unworthy of the occasion of coincidences that lend it support. He publishes a book a year, and his 1999 "The Fifth Miracle", was about the spontaneous generation of life on Earth ~3 billion years ago. It could equally apply to the Big Bang. He writes: *The search for life elsewhere in teh universe is therefore the testing ground for two diametrically aopposed world-views. On one side is orthodox science, with its nihilistic philosophy of the pointless universe, of impersonal laws oblivious of ends, a cosmos in which life and mind, science and art, hope and fear are but fluky incidental embellishments on a tapestry of irreversible cosmic corruption. On the other there is an alternative view, undeniably romantic but perhaps true nevertheless, the vision of a self-organizing and self-complexifying universe governed by ingenious laws that encourage matter to evolve toward life and consciousness.*
- I hope in this brief quote you catch the drift, it's CS Lewis' "Materialist Magician" referred to by Screwtape at a banquet in his honor.

Brandon Carter: the Anthropic Principle

- Materialism suffered yet a third attack, one that perhaps was common in biology but took Physics by surprise. That is, the great improbability of our universe. There are many amazing factors in calculating improbability, but for our purposes, one will do.



The present universe is a delicate balance betweer the expansion of the Big Bang, and the contraction due to gravity. These equations result in a size of the universe that appears like the argument of an exponential. To find that 8 billion years after the event, the universe appears "flat" requires a cancellation of those two unrelated terms, accurate to 60 decimal places. Had it been different by 1 par in that zillion, the universe today would either be a black hole, or cold diffuse gas.

- There are many ways to view this paradox. Barrow and Tipler in their 1986 book argue for selection effect. That it only *appears* improbable, when it actually was highly probable. The fallacies of this argument require a few subtleties of Aristotelian logic: Consider a fellow th was sent to the firing squad and 100 rifles fired at him but he was still alive. B&T say (1) **he should not be surprised because he couldn't observe anything if he were dead**. This is incorrect. Now it is true that (2) "**He should not be surprised that he does not observe tha he is dead**," but that does not mean the same thing as (1), and in fact, it is eminently reasonable that "**He should be surprised that he observes he is still alive**." Our universe should surprise us.
- This does not necessarily prove God's existence, and a large coterie of desperate materiali have taken refuge in Bayesian analyses that argue, in essence, "so what?". Yet everyone acknowleges, friend and foe alike, is that this turn of events is highly unlikely. The universe is not "necessary", nor was it "likely", it was contingent.

William Dembski: Design/Purpose

- Why is contingency such a big issue? Can we echo the skeptic & say "So What?"
- Remember Sagan's assertion, that Hawking proved "there was nothing for a creator to do"? Necessity, or universal law, is the principle assertion of naturalism (the philosophical baggage tha invariably attends scientific materialism). And whatever is not determined is arbitrary. These two options, they assert, exhaust all possibilities. Natural Law & Chance. There is no other possibility, no purpose, no teleology left. Whether we talk about Epicurus, Darwin, or Hawking, they all deny purpose. Why do they hate Aristotle so much? Because to allow Aristotle, is to require a god. Not even agnosticism survives this camel's nose.
- Is this dichotomy exhaustive? Is it even logical?
- Dembski argues that common sense dictates a third way. With the publication of "The Design Inference" in 1998 he develops the category of "design", and an algorithm to detec it: **Given an event, is it (a) a product of known laws? If not, was it (b)a highly probabl but arbitrary chance? If not, then it must be (c) designed.**
- There are many ways to restate this algorithm, the one that most appeals to me is the corollary with information theory. How much information is encoded in a message? How compactly can I compress that file on my computer? How do I maximize the signal to noise ratio? All these questions are meta-questions. That is, without deciphering the message, I can still measure its information content! (A nice Physical Review article that used PKZIP to determine information content & language trees.)
- Thus a contingent Universe requires, proves, necessitates a meaningful Universe.

An August Conclusion

- Now recall the whole reason Epicurus (or at least Lucretius) argued for a denial of teleolog In order to set men free of the bounds of ethics, of moral laws, of making sense of life and especially death. What Augustine told us, and science confirms, is that despite our best efforts to deny it, the Universe contains meaning.
- What then can we say about the Materialism vs. Augustine debate? Augustine won a TKO.
  - 1) Matter is not eternal, nor space, nor even time. All these had a beginning. And thus it entirely accurate to say the Universe is finite. All forms of pantheism or panentheism ar denied simply because equating the Universe to God makes God finite, an oxymoron i there ever was one. We are led, inexorably, to the question, "Why a beginning at all?" If there was nothing before, why should our universe suddenly begin at all? Where did it a come from?
  - 2) The Universe was created out of nothing. Democritus was dead wrong. Our belief in the permanency of the material has been profoundly shaken. Whatever power, whateve force, whatever brought this Universe into blazing existence, did so out of nothing.
  - 3) That force was not impersonal, that force was not random, that force was intelligent. assert, with no effort at proof, that meaning implies intelligence, that purpose implies a person. For denial of a better word, let us call that intelligent person, God.
- What then can we say about this God?
- If it is not the universe itself, it existed before the Universe. The Universe being finite in both space and time, it is only reasonable to assume it is neither. If it created the Univers out of nothing, it is supremely powerful, and able to repeat that feat at any moment. Augustine was vindicated beyond his wildest dreams. The world is not safe for atheism. Theology is once again Queen of the Sciences. Physics, Chemistry, Biology has changed.

Quantum Purpose (take Dillard's class!)

- We are now at a crossroads. Scientific Materialism has lost its foundation and is drifting on the high seas. Yet, we have been told, the ascendancy of western science was built upon this rock. What will be the support of science in this tossing sea of post-modern relativism? Are any of the competitors of materialism worth re-examining? Or are we destined to be deluged with pseudo- science, parapsychology, New Age animism & sophistry? What can we rescue from the shipwreck, and what can we glean from Scripture that will provide a solid base f 21st century science?
- Real scientists, though only the famous ones can say so publically, have been grappling with this question since QM was invented in 1930. Everyone asks "Ho do we know?" Rather than sort through the arcania of QM interpretations, let might work from the other direction, from a Christian perspective.
- Thus epistemology is the key. How do we know what we know? What is Truth? W must abandon the false security of "scientific objectivity" and grapple with the world in exactly the same manner as Augustine--begging the Holy Spirit to direc us. Augustine was able to be supremely, miraculously prescient because he sought the Holy Spirit in his scientific endeavors. He pleaded for wisdom, he admitted his ignorance, he praised God for revealing his truth. This is the true sense of the word "Confession", and the title of his book. For all truth is persona All knowlege is subjective. This is not relativism, for the object of our knowlege i permanent, the Truth is a person.