



Institute For Theological Encounter With Science and Technology

Volume 55 - #1

Winter 2024 Bulletin

How will you spend this Lent?

Today is Valentine’s Day as well as Ash Wednesday! Lent and Easter come early this year. Perhaps a Lenten practice might be to view one of our webinars which you will find on page two of this bulletin. We list some prior webinars as well as new webinars coming up. What will you do this year for Lent?

The basic theme of this bulletin is about destruction. Last year the *Oppenheimer* movie made its debut as one of 2023's hit movies. I felt it was quite well done providing a great reflection on and knowledge about J. Robert Oppenheimer. Along the way we watched America’s race to beat the Nazis to build the first atomic bomb. We saw Oppenheimer’s struggles in life as the movie progressed. It took us through his time at the Los Alamos Laboratory in New Mexico as director of the Manhattan Project. In 1954, he would lose his security clearance because there were many threats against people who had been Communist Sympathizers during the Depression. In 2022, the United States Secretary of Energy signed an order vacating the 1954 decision by the Atomic Energy Commission to revoke the security clearance of Dr. Oppenheimer.

Our winter bulletin contains four main articles. Dr. Tom Sheahan speaks of the “new world” of nuclear energy which is the theme of the *Oppenheimer* movie. He provides a brief synopsis of the nuclear age and the discoveries that made it possible. It can be a refresher for some and an enlightening piece for others. The next article also refers to the *Oppenheimer* movie but through the worldview of a 15-year-old. Dr. Sebastian Mahfood interviews his daughter, Eva, after they watched the *Oppenheimer* movie. Our third article by Dr. Pat Castle talks about the destructive nature of abortion. He provides numerous statistics that are quite informative, and he describes abortion as the A-bomb of our time. Our final article is Dr. Tom Sheahan’s review of the book, *A Fortunate Universe*. It deals with the fine-tuning of the universe. The book is recommended for college-aged students and above, and it helps if one has some math and physics in their background.

Each January, the March for Life is held in Washington, D.C. to end abortion. Some view abortion as an atomic bomb that kills many innocent lives each year. Hopefully, Lent can be used as a season of prayer. Prayers to end abortion. Prayers to avoid war – especially nuclear war. Prayers to end conflicts across the world.

We live in interesting times. How will you spend this Lent?

Ralph Olliges, Ph.D.
Editor, *ITEST Bulletin*

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Announcements

ITEST Webinars

Watch our most recent ITEST webinars on demand.

| Date | Title | Presenters | Link to recording/ |
|----------|---|--|---|
| 11/18/23 | Education and Evangelization in the Age of AI: Promise and Perils | Greg Miller Sebastian Mahfood, OP, PhD | https://faithscience.org/education-age-of-ai/ |
| 12/02/23 | Science, Reason, and Faith: Discovering the Bible | Fr. Robert Spitzer, SJ, PhD Thomas Sheahen, PhD | https://faithscience.org/science-reason-faith/ |
| 12/16/23 | Bridging the Chasm: Quantum Mechanics and Christian Spirituality | Terrence Lagerlund, MD, PhD Robert Kurland, PhD | https://faithscience.org/bridging-the-chasm/ |

Register now for these webinars.

| | | | |
|----------|--|--|---|
| 02/24/24 | Teaching Research Processes | William Badke, PhD Stacy Trasancos, PhD | https://faithscience.org/teaching-research-processes/ |
| 04/13/24 | How Does Social Media Affect Children? | Kevin Powell, MD, PhD Sister Marysia Weber, RSM, DO | https://faithscience.org/children-and-social-media/ |

Registration coming soon for these webinars.

| | | | |
|----------|--|---|---|
| Jun 2024 | Abortion Pill Reversal | Stephen Sammut, PhD Stacy Trasancos, PhD | Registration coming soon at https://faithscience.org/ |
| Aug 2024 | A New Understanding of Quantum Mechanics: Back to Aristotle and Aquinas | Robert Kurland, PhD | Registration coming soon at https://faithscience.org/ |
| Oct 2024 | Brain, Soul, Artificial Intelligence, and Quantum Mystery | Terrence Lagerlund, MD, PhD | Registration coming soon at https://faithscience.org/ |
| 12/14/24 | Black Holes and Free Will: Demystifying Science and Restoring a Proper Relationship with our Faith | Mattheus Uijtewaal, PhD Bishop Everard de Jong | Registration coming soon at https://faithscience.org/ |

Watch all previously recorded ITEST webinars at www.faihtscience.org/news-and-events/.

See page 6 for more announcements.



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ITEST Bulletin - Ralph Olliges, Ph.D., Editor, Sister Marianne Postiglione, RSM, Senior Editor
Sheila Roth, Managing Editor ISSN 1073-5976 • Copyright © 2024

The “New World” of Nuclear Energy

By Thomas P. Sheahen

In the recent movie *Oppenheimer*, a lot of attention has been given to the first atomic bomb test, where Oppenheimer declared that “we’re in a new world.” Actually, the story is more complicated. The real “new world” was the discovery of nuclear energy.

The ancient Greeks had the concept of the “atom,” but it was only in the latter 19th century when scientists began making refined measurements. J.J. Thompson introduced the concept of negatively charged *electrons* orbiting around a positive point in the center. Many brilliant scientists contributed experimental evidence that improved understanding of the atom.

In the 1890s, Roentgen and Marie Curie pioneered the new science of *radioactivity*: that is, atomic nuclei changing identity while emitting a high energy particle, classified as either α , β , or γ particles. All this remained rather mysterious well into the 20th century.

In 1900, Max Planck originated the term “quantum,” and a new branch of physics began. In 1913, Neils Bohr proposed the picture of the atom that we all still use today, with electrons whirling around the center. In the 1920s, several theoretical advances (mostly by German scientists) led to a convincing new theory of atomic behavior called *Quantum Mechanics*.

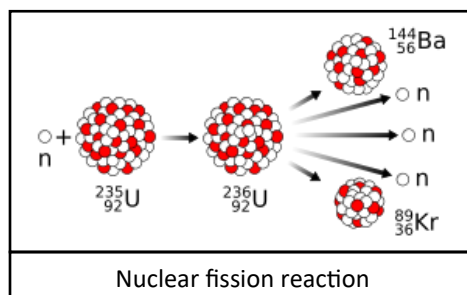
One advance that simplified calculations came in 1927, when J. Robert Oppenheimer proposed that the nucleus does not move during the time of an electronic transition. That became known as the *Born-Oppenheimer approximation*. Oppenheimer continued to be a major figure in managing new physics research.

As more data was collected, researchers developed a better picture of the nucleus, too. In 1931 the *neutron* was distinguished from the *proton* as two constituents in every nucleus. The 1930s was a decade of great advances in understanding the behavior of nuclei. Research expanded rapidly, and soon both the *strong nuclear force* and the *weak nuclear force* were recognized. It was all celebrated as an enormous triumph of Quantum Mechanics.

Within a few more years, the number of protons and neutrons in most elements of the periodic table was

determined. Every nucleus contained as many protons as there were electrons in the atom, and the number of neutrons was equal to or greater than the number of protons. Some *isotopes* of heavier elements spontaneously emitted radioactive particles, which explained the findings of Marie Curie and others. Curie’s *alpha radiation* is a pair of protons bound to a pair of neutrons, essentially a Helium nucleus; *beta radiation* is an electron; *gamma radiation* is a powerful photon, an electromagnetic wave of very high energy. Measuring those very high energy particles immediately taught physicists that the binding force within a nucleus was far stronger than any force encountered at the atomic level.

Knowing that the nuclear binding force was so strong, then obviously you could *release* a lot of energy by breaking a nucleus apart. The really major advance took place in 1938, when *nuclear fission* was discovered in Germany by Lisa Meitner and Otto Hahn. There were many assorted nuclei that might give off a radioactive particle (α , β , γ), but some nuclei could actually be caused to break into smaller parts, forming two lighter atoms -- and would release the leftover binding energy. All by itself, hardly any isotope would fission spontaneously; so the natural process was very slow. However, if energetic neutrons were fired at certain nuclei, fission could be caused to occur. The leading candidate material was the element Uranium, which had one isotope (Uranium-235) that would fission when struck by a neutron.



Each fission event released an enormously large amount of energy, as well as a few extra neutrons. Attention turned at once to trying to harness and make use of all that energy. It was recognized that the stray extra neutrons might run into another nucleus, causing that nucleus to fission as well. A chain reaction could occur.

In 1939, Leo Szilard (a Hungarian émigré to the USA) wrote a letter for Albert Einstein to sign, directed to President Roosevelt, saying that an uncontrolled chain reaction would release so much energy at once that it would be an exceptionally powerful

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bomb. Roosevelt's trusted military adviser, General Leslie Groves, understood the physics and saw the opportunity. Soon thereafter, the *Manhattan Project* was begun, with Oppenheimer in the lead role.

In Germany, where fission was discovered, the Nazi leaders were contemptuous of "Jewish Physics" (the kind being studied by Einstein, Lisa Meitner, and many others). Accordingly, they didn't perceive the potential applications of nuclear fission, and did not fund an effort comparable to the *Manhattan Project*. By the time they realized that mistake, they were about two years behind the American program. Subsequently, a key *Heavy Water* plant in Norway was destroyed by allied saboteurs, so there was no German A-Bomb program. This sequence of decisions and events brings to mind the ancient saying "The mills of God grind slowly, but they grind exceeding small."

(In 1998, the play *Copenhagen* simulated a very important meeting between Neils Bohr of Denmark and Werner Heisenberg of Germany (both major contributors to Quantum Mechanics) in which they discussed nuclear fission. The play was in three acts, and each presented a different version of their meeting, with different outcomes. True to the spirit of Quantum Mechanics, it was left for the observer to decide the outcome. I chose the version of the second act, where *the Germans were not trying to build a bomb*. Rather, they wanted to harness the power of nuclear energy.)

It was apparent that if the chain reaction could be *moderated* and controlled, it could be a long-term source of energy. Thus, the effort to build a *nuclear reactor* was begun, and in 1943 Enrico Fermi achieved success, in a reactor hidden under a stadium in Chicago. A controllable reactor provided numerous benefits, not least of which was a reliable stream of neutrons. It was discovered that the relatively useless isotope Uranium-238 could be converted into the adjacent element Plutonium-239 in a reactor. Then chemical means of separating those elements could be done (far easier than separating isotopes of the same element) and soon the *Manhattan Project* had a substantial supply of Plutonium-239, which was also fissionable and hence bomb material.

The first atomic bomb was made of Uranium-235, but the second bomb was Plutonium-239. Thereafter, Plutonium was always the preferred material. (The enduring "non-proliferation" effort to keep rogue countries from getting the bomb is primarily a matter

of preventing them from making Plutonium.)

After World War 2, attention was directed to making nuclear power a controlled source of energy. What was needed was *partially enriched* Uranium, at a level of about 4% U-235. Within a few years a nuclear reactor was running and producing electric power. Development proceeded rapidly during the 1950s, and in the 1960s construction began of many commercial nuclear reactors, several of which are still in operation today.

America was shocked by the rapid success of the Soviets, and intense fear of Communism spread nationwide.

Meanwhile, weapons research after WW2 turned toward developing *nuclear fusion*, where Hydrogen is converted into Helium, and a still much greater release of energy takes place. That led to the hydrogen bomb. Incidentally, Plutonium is used as the "trigger" *fission* explosion to set off the fusion explosion of a Hydrogen bomb. Because of Russian spies, the Soviets were only a little behind America in that enterprise, and soon the "cold war" was on, a race for bigger and better bombs.

America was shocked by the rapid success of the Soviets, and intense fear of Communism spread nationwide. It was in that milieu that the *McCarthy Hearings* took place. A wide variety of people were investigated, notably some Hollywood figures, but American scientists as well. Oppenheimer's early flirtations with Communism cast suspicion over him. (Many Americans thought well of Communism during the depression of the 1930s.) His security clearance was revoked, and it took over 2/3 century for him to be officially exonerated.

With hindsight, it is clear that Oppenheimer was both a fine scientist and an excellent manager, who succeeded in keeping a team of brilliant scientists and engineers focused on a military goal that eventually won the war. In 1945, it was anticipated by most military leaders that America would suffer over a million deaths while invading Japan using land forces.

In the early 1960s, optimism toward nuclear power was so high that the prediction was made that "soon electricity would be too cheap to meter." But the cold war had everyone fearful of annihilation by nuclear

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weapons. Fear of anything radioactive or nuclear became widespread. Erroneous rumors were stoked, such as that “a nuclear reactor could blow up like a bomb.” It can’t. By the late 1970s antipathy to the word “nuclear” was so strong that no more nuclear power plants were built for half a century.

Today we have two consecutive generations of schoolteachers who are frightened by the word

“nuclear,” which leads to similar fright among growing children, and hence there is great public opposition to nuclear power. The reality is that nuclear reactors have an exceptionally good safety record, but people only focus on rare adverse events like *Chernobyl* and *Fukushima*. Scientists can hope/wish that as the need for more energy from *reliable* sources becomes urgent, the public will accept nuclear reactors once again. ■

On Just Wars and Doomsday Machines: Dr. Oppenheimer meets Captain Kirk

or

“Yes, Eva Ruth, the better world is the one *you* make.”

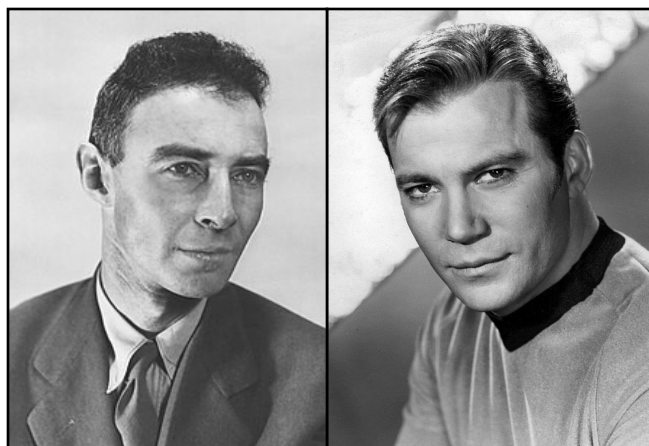
By Sebastian Mahfood, OP

On May 27, 1954, during the height of the Red Scare, the Atomic Energy Commission (AEC) revoked the security clearance of Dr. J. Robert Oppenheimer, the director of the Manhattan Project based in Los Alamos, New Mexico, who became known as the “father of the atomic bomb,” under trumped up allegations of his ties to communism. Though Oppenheimer died on February 18, 1967, the United States Department of Energy (USDOE), an organization that succeeded the AEC, recently vacated, on December 16, 2022, the 1954 revocation, which Jennifer Granholm, the US Secretary of Energy, said had been adjudicated “through a flawed process that violated the Commission’s own regulations.” So, the USDOE’s nullification of the AEC’s 1954 revocation was not done to restore Oppenheimer’s security clearance, but to restore the integrity of the security-review process.

Security-review is far less important than building quality into an operation from the beginning, as W. Edwards Deming might have told us, and far more important than, let us say, allowing an injustice to fester into organizational gangrene, somewhere in between. But it does tend to bury the lead concerning why such a process is needed at all. After fathering the atomic bomb, Oppenheimer knew better than anyone the impossibility of putting the genie back in the bottle and had dedicated the remainder of his life to preventing the further weaponization of atomic power, particularly in the form of the hydrogen bomb. At the end of the eponymously named film *Oppenheimer*, directed by Christopher Nolan and theatrically released on July 21, 2023, Oppenheimer, played by Cillian Murphy, reminds Einstein, played by Tom Conti, of a concern he’d earlier shared that the bomb could create a chain reaction that would destroy the

entire world. When Einstein asks, “What of it?” Oppenheimer responds, “I believe we did.”

Certainly, that concern has remained at the forefront of everyone’s mind whenever nuclear powers come into conflict with, well, anyone. Consider the present-day wars in Ukraine and Gaza and the threats of India’s, Pakistan’s, and North Korea’s possession of nuclear weapons. Apologists for the proliferation of nuclear arsenals will suggest the public celebration of such doomsday machines serves to deter enemy aggression, an idea explained in Stanley Kubrick’s 1964 political satire *Dr. Strangelove or: How I Learned to Stop Worrying and Love the Bomb* when Dr. Strangelove, played by Peter Sellers, points out to the Russian ambassador, played by Peter Bull, “Of course, the whole point of a doomsday machine is lost if you keep it a secret!”



Dr. J. Robert Oppenheimer

William Shatner as Captain Kirk

In discussing all of this with my 15-year-old daughter, Eva Ruth, I found she had made her own points

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of connection between what we witnessed in the film *Oppenheimer* and what she'd seen in her favorite television series, *Star Trek*, created by Gene Roddenberry. While the works are fundamentally different, both raise questions about the ethical implications of scientific advancements and the potential for catastrophic consequences. In "The Doomsday Machine," the USS Enterprise encounters a planet-destroying weapon created by an ancient and extinct civilization, which Captain Kirk and his crew have to find a way to disarm before it destroys the whole galaxy.

The episode, a bit like *Oppenheimer*, explores themes of military power, the destructive potential of technology, and the consequences of unchecked scientific advancements. At least Kirk was able to resolve the threat, to mix film genres, before Sith Lords like Emperor Palpatine were able to harness it.

The question, "Daddy, is there a Santa Claus?" is generally an easier one to answer than "Daddy, why do we build weapons as a deterrent and then actually use them?" When kids grow up, so do their questions.

In our response, we may stumble through St. Augustine's "Just War Theory." We may invoke the insight of the great cyberethicist, Darth Vader, who responds in a spiritual way to Conan Motti's assertion that the Death Star is the ultimate power in the uni-

verse: "Don't be too proud of this technological terror you've constructed. The ability to destroy a planet is insignificant next to the power of the Force." We may affirm Christ's mandate to "love the Lord, your God, with all your heart, with all your being, with all your strength, and with all your mind, and your neighbor as yourself" (Luke 10:27). We may simply ask, "Will your generation do better?"

Whatever our response, we want to demonstrate more clarity than David Tennant's Dr. Who, whose explanation of time in the tenth episode of season 3 is that "it's like a big ball of wibbly-wobbly, timey-wimey stuff." We want an explanation for our sending weapons of mass destruction to Ukraine and Israel comparable at least to Oppenheimer's explanation for the importance of shipping isotopes to Europe for medical purposes as "far less important than electronic devices but far more important than, let us say, vitamins, somewhere in between." We might lean on Uncle Ben's advice to his nephew Peter Parker in *Spiderman*, "With great power comes great responsibility." Ultimately, we might get to the response Ben Stone, played by Josh Dallas, gives to Angelina Meyer, played by Holly Taylor, in the final episode of the Netflix series *Manifest*, "It's not the power you have, but how you use it." So, yes, Eva Ruth, the better world is the one *you* make, formed as I've raised you in the light of our Christian faith. ■

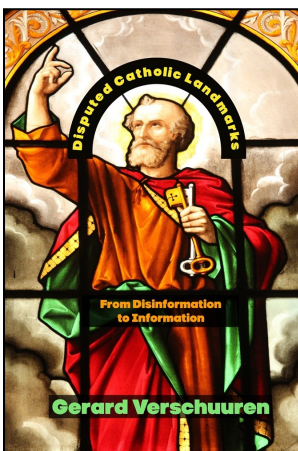
Announcements (continued from page 2)

New Book

Disputed Catholic Landmarks by Gerard Verschuuren

Everyone's life has landmarks: when you were born, when you graduated from school, when you got your first job, when you got married, and so many more. There must be many landmarks in the history of the Catholic Church, too. Just think of issues such as the Crusades, the Inquisition, the Protestant Reformation, the Holocaust, and several more. What all of them also have in common is that they are disputed, challenged, and contested—ripe for discussion and open to various interpretations. Is it possible to dispel misinformation from people's minds that are filled with prejudiced opinions? Verschuuren endeavors in this book to do just that, separating truths from untruths, facts from fictions, and information from disinformation.

Buy this book at www.enroutebooksandmedia.com/disputedcatholiclandmarks/



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We welcome your feedback regarding this issue of the *ITEST Bulletin* or any ITEST activity. Write a letter to the editor at ITEST@archstl.org or mail to ITEST, Cardinal Rigali Center, 20 Archbishop May Drive, Saint Louis, MO 63119.

Disarming the Greatest A-bomb

by Dr. Patrick J. Castle, retired Air Force scientist

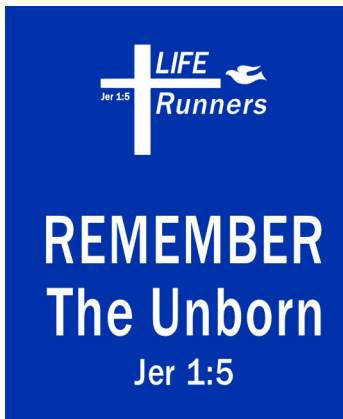
The two atomic bombs dropped on Japan to end World War II resulted in 105,000 people killed. An atomic bomb explodes from the chain reaction of splitting atomic nuclei, releasing destructive energy. However, that energy pales in comparison to the power of life, set off at the moment of conception followed by cells dividing over and over. The greatest A-bomb is abortion, killing more people world-wide than all other causes of death combined. 44.6 million people are aborted worldwide each year by way of dismemberment, starvation, or lethal injection in the womb. About 1 million Americans are killed by abortion each year, which is more than all combat deaths in the history of our nation. The average number of abortions per day since 1973 is more than the 3,006 people (including the 10 known unborn children) killed on Sept 11, 2001. On that day, I was the Weapons of Mass Destruction (WMD) Defense Officer in an American unit on a Turkish base. As the leader of the LIFE Runners apostolate, I am still a WMD Defense Officer, defending unborn children, mothers, and fathers from the devastation of abortion.

St. Mother Teresa of Calcutta said,
“Abortion is the greatest threat to
peace in the world. Life is too
precious, do not destroy it.”

Defending against WMD threats was fueled by my love for God and agreement with Christ’s perspective on the infinite value of each person. Jesus demonstrated the infinite value of each person in the parable of the lost sheep, when the Good Shepherd left 99 sheep behind to rescue the 1 lost sheep. When developing the Ethics Across the Curriculum program at the United States Air Force Academy, I honed my understanding of the slippery slope of rationalizing (not justifying) the taking of human lives. My nano-analytical chemistry PhD work at the University of Illinois gave me an atomic level perspective which developed in me an even greater awe for how we were wonderfully made by God.

After retiring from the Air Force in 2014, I became a full-time Pro-Life missionary. For one year, I led a Pro-Life media ministry, preventing abortion with life-

affirming messages. Then, for two years I taught high school chemistry, where I learned about the culture and how abortion was being sold. Now, I lead the LIFE Runners apostolate, the world’s largest Pro-Life team, penetrating deep into the culture with life-saving messages.



In my school presentations, I help educate students about the reality of abortion to help them understand that it truly is the greatest evil, qualitatively (heinous killing of an innocent child) and quantitatively (top cause of death on the planet). Abortion is the crown jewel of satan. Hard to comprehend that the

most dangerous place on the planet is a mother’s womb. The first step for a proper perspective on abortion is to define the A-word. On a few occasions, I’ve had teachers ask me, “are you going to mention the A-word?” How can I give a presentation on the consequences of abortion without mentioning the word abortion? This would be like giving a presentation on the atomic bomb without using the word bomb.

70% of abortions are completed with the “abortion pill” which is a combination of two drugs taken 24 to 48 hours apart, mifepristone and then misoprostol. Mifepristone causes the uterine lining to harden which disrupts implantation of the baby, resulting in death by starvation. Misoprostol causes contractions, and the baby is miscarried. When the abortion pill “bomb” explodes inside a mother, the baby is killed and the mother is injured. These “little bombs” are even delivered through the mail, albeit illegally. For mothers who regret taking the abortion pill, they have a 64% chance of saving their baby if the abortion pill reversal¹ (high dose of progesterone) is taken before the second drug, misoprostol. The progesterone offsets the mifepristone which acts as a progesterone inhibitor.

Abortion is the front line in the war between good or evil, God or no-God, life or death. Here are statistics from the American abortion battlefield.

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- 64 million+ American children aborted since 1973. 9 million people killed in Nazi Holocaust. America is one of seven countries with abortion on demand for entire pregnancy.
- 930,000⁺² children will be aborted this year, the top cause of death. 646,000+ Americans killed in combat in all American wars.
- 2,500 children die from abortion per day (ends 20% of pregnancies). From the Sep 11th attacks, there are 2,996 casualties reported (should be 3,006 with 10 known unborn children).
- Only 18,000 adoptions per year (under 2 years old): 1.5 million couples waiting, 2 year waiting line.
- 39 women reportedly died during illegal abortions in 1972. Legal abortion causes the death of 5 women and about 500,000 female babies per year since 1973.
- 0.02% of pregnancies are "life of the mother" cases. In the United States, 20 mothers die for every 100,000 births. Most of those deaths could have been prevented with medical treatment.
- 2% of pregnancies are ectopic, 68% dissolve naturally, the rest can be monitored and safely treated.
- 23% increase in mental disorders³ for each exposure to abortion.
- 24% of women have had an abortion. percentage of abortions by mother's age (years): <15 (0.2%), 15–17 (3%), 18–19 (8%), 20–24 (34%), 25–29 (27%), 30 and up (27.8%).
- 37% of pregnancies among black women are aborted, compared with 12% for white women and 19% for Hispanic women. 36% of all abortions were obtained by black women.
- 37% of Planned Parenthood revenue is from tax dollars (over \$600 million per year). Planned Parenthood aborts over 380,000 children per year.
- 40% of women attended a church service within the same month as their abortion.
- 51% of mothers seeking abortion were using a contraceptive method in the month they became pregnant.
- 60% of abortions are from mothers who already had children.
- 64% success rate with abortion pill reversal.
- 66% of regular church attendees identify as Pro-Life. Pro-God is Pro-Life⁴. John 10:10
- 70% of abortions are done with pills. The first pill

is mifepristone which starves the baby (prevents implantation). The second pill, misoprostol, is taken 24-48 hours later to empty the uterus.

- 84% of post-abortion mothers felt they had no choice.
- 90% of abortions in first 12 weeks (95% in 15 weeks). percentage of abortions by age (weeks)⁵: <6 (43%), 6-9 (36%), 9-13 (13%), 13-20 (7%), >20 (1%).
- 64% felt coerced⁶ (perceive silence as consent).
- 63% sought or wanted help⁷ after chemical abortion.
- 45% of abortions are repeat, healing support⁸ prevents repeats.
- 40% of minors having had an abortion report that neither of their parents knew.
- 85% false positive for prenatal genetic screenings. People diagnosed with Down syndrome are aborted at these rates: US (35%), UK (48%), Iceland (99%).
- 90% of relationships end after an abortion.
- 90% don't know where to go for healing⁸.
- 94% regret their abortion. 80% regret aborting their child because of rape and incest. Abortion does not fix circumstances.

We stop satan with God, death with life,
sin with forgiveness, hate with love,
darkness with light, despair with hope,
suffering with compassion...

How can we help disarm (prevent) A-bomb explosions? With 45% of abortions being repeats and 90% of relationships ending with abortion, how can we stop the fatal aftershocks? We stop satan with God, death with life, sin with forgiveness, hate with love, darkness with light, despair with hope, suffering with compassion, etc. We ready ourselves with theological and scientific truth, all from God. We exercise these truths with virtuous actions, being "doers of the Word" (James 1:22). We put our faith in action by supporting ministry work that disarms abortion with support and healing. Wounded mothers turn to abortion. Mothers surrounded by support (love) don't turn to abortion. Abortion is never needed. Abortion is the greatest problem imaginable, by the numbers. Help

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disarm abortion with faith and reason; lives are depending on us.

- 78% of post-abortion mothers said if they had encouragement, they would have chosen life.
- 79% of post-abortion mothers didn't know about free help. Lead mothers to assistance at one of the [3,000+ pregnancy help centers](#)⁸. Over 64% of abortion-vulnerable mothers choose life when they see

their unborn baby ultrasound image. Pregnancy help centers provide assistance for 2 years on average.

- Up to 75% no show for abortion appointments when people are praying at one of the [670 abortion facilities](#)⁹.
- 45% of abortions are repeat, [healing support](#)⁸ prevents repeats. ■

Dr. Pat Castle is the founder of *LIFE Runners*, the world's largest Pro-Life team with 22,700+ teammates who



wear “REMEMBER The Unborn” jerseys as a public witness in 3,500+ cities. Pat received the Springtime Foundation Christian Unity Award and was part of the movie *Unplanned*. Pat encountered [St. Padre Pio](#)¹⁰ while racing up Pikes Peak and carried a “REMEMBER The Unborn” flag to the top of Mt. Kilimanjaro. He cofounded the annual [Law of Life Summit](#)¹¹ and the annual [A-Cross America Relay](#)¹², the largest spanning Pro-Life event. Pat served as a pregnancy help center chairman and teaches outreach at abortion facilities. He completed the Notre Dame Vita Institute and is a fourth degree Knight of Columbus. Pat directed youth retreats and RCIA. He grew up in Sioux Falls and graduated from the Air Force Academy. Pat earned a PhD in nano-analytical chemistry from the University of Illinois and is a board member at the Institute for Theological Encounter with Science and Technology. He did ten military assignments, including the Weapons of Mass Destruction defense officer at the base closest to Osama bin Laden on Sep 11th. While an Air Force Academy chemistry professor, Pat developed the ethics curriculum and coached the marathon team. He is a sub-3-hour marathoner, racing 25 marathons including Jerusalem, Venice, Boston, Pikes Peak, and Great Wall of China. Pat has delivered millions of life-saving messages and raised over \$5 million to help end abortion. He [speaks across America](#)¹³. Get his team *Daily Devotions* [book](#)¹⁴ to be All In Christ for Pro-Life!

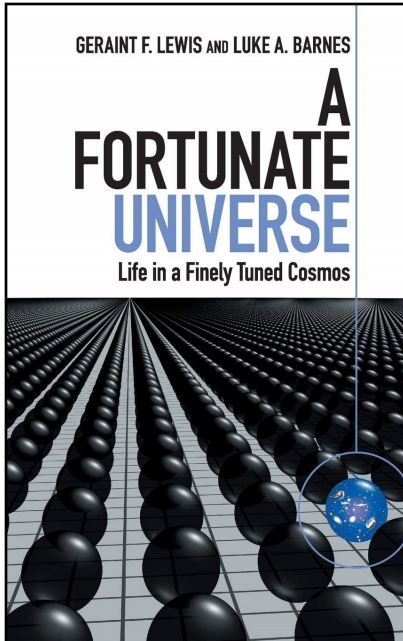
- 1 Learn more about abortion pill reversal from the ITEST webinar, *Surviving Abortion: Inside and Out*. Watch the webinar on demand at <https://faithscience.org/surviving-abortion/>. Watch the ITEST homepage, <https://faithscience.org/> for another webinar on abortion pill reversal in 2024.
- 2 <https://www.heritage.org/life/commentary/new-abortion-numbers-dont-show-whole-picture-especially-do-it-yourself-abortions>
- 3 <https://lozierinstitute.org/fact-sheet-abortion-and-mental-health/>
- 4 <https://www.msn.com/en-us/news/opinion/by-the-time-abortion-makes-the-ballot-the-battle-s-over/ar-AA1jRGOi?ocid=hpmsn&cvid=64c76fdc3d704e9ba53b6dfd1d33000b&ei=31>
- 5 <https://www.washingtonpost.com/health/2022/06/21/abortion-procedures/>
- 6 <https://www.dailysignal.com/2023/02/07/exclusive-over-60-of-women-who-got-abortions-reported-high-level-of-pressure-study-finds/>
- 7 https://www.lifesitenews.com/news/study-finds-6-in-10-women-who-had-chemical-abortions-wanted-help-or-emotional-support-after/?utm_source=daily-usa-2022-10-13&utm_medium=email
- 8 <https://www.liferunners.org/help/>
- 9 https://www.lifesitenews.com/analysis/130-abortion-facilities-closed-report/?utm_source=most_recent&utm_campaign=catholic
- 10 <https://www.lifesitenews.com/episodes/st-padre-pio-divine-intervention-launches-a-pro-life-movement/>
- 11 <https://lawlife.org/>
- 12 <https://www.liferunners.org/race/across/>
- 13 <https://www.liferunners.org/speaking/>
- 14 <https://stores.inksoft.com/liferunners/shop/product-detail/1002991>

Book Review

A Fortunate Universe
Life in a Finely Tuned Cosmos

by Geraint F. Lewis and Luke A. Barnes (Cambridge University Press: 2016)

reviewed by Thomas P. Sheahen



By now it is widely recognized that the exceptional precision of certain numerical values in nature are a prerequisite for human existence. Of course, we tend to ask “Why?” Understanding what fine-tuning *means* is a terribly important theological question.

An age-old question is “Why is there something instead of nothing?” Six decades ago, Eugene Wigner discussed

“The Unreasonable Effectiveness of Mathematics.” Three decades ago, Stephen Hawking wondered who put the “fire in the equations” to get from mathematics to reality. One decade ago, in “The Reason Series,” Fr. Robert Spitzer, S.J., had his characters leaning over the engine of a Ferrari, to underline the term “fine tuning.”

This book is about the fine-tuning of the universe – starting with an explanation of the basic physics, then a discussion of various speculations, and finally a philosophical dialog about what it all means. The authors, Australian physics professors, refer to themselves as Geraint and Luke in their dialog. A foreword by Australian Nobel-Prize winner Brian Schmidt ensures that this is not a fluffy popularization, but a serious treatment of an important matter.

The first chapter establishes a conversation between “two cosmologists thinking about the universe,” to which they’ll return in the last chapter. The magnitude of the universe – hundreds of billions of galaxies, each containing hundreds of billions of stars with their planets – always creates a sense of amazement, and naturally we wonder if there is other life out there comparable to ourselves. We wonder “what if ...?”

the laws of nature were different.

It turns out that even a tiny change causes those laws to go awry. “...messing around with the laws of physics radically alters the workings of the Universe. Many universes are inhospitable for life, even completely sterile. Ruining a universe is easy.” “How did all the right pieces come to exist in our Universe?” “That is the fine-tuning problem. ... The fine-tuning of the Universe for life is the realization that if the laws of physics were different, even just by a little bit, life would not exist.”

From there, Lewis and Barnes go on to explain the importance of several fundamental characteristics of our Universe, presenting several versions of the *Anthropic Principle*, which can be:

- a) Weak: because we’re here, the universe obviously permits the existence of observers, or
- b) Strong: intelligent life is central to the being of the Universe.

The subsequent unfolding array of questions leads into several chapters that address how exquisitely special is our life in our universe.

From the incredible complexity of the human body, downward steps lead through chemistry and physics to the quark level, where just a dozen particles and antiparticles comprise the set of building blocks. Only three particles make up everything we can see. They explore the question “what happens if we change something just a little?” Disaster! “...if these properties had been slightly different, the intricate physics and chemistry of our universe would not exist. These other universes have a vastly diminished ability to form the complex molecules that are essential for life....”

Chapter 3 takes a very close look at what a force is, and contains a clear explanation of the “particle” nature of forces, including *Feynman diagrams*. Sure enough, the numerical constants associated with each of the four fundamental forces are likewise fine-tuned and essential for the many nuclei of the periodic table. Even the “weak force” is indispensable.

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Chapter 4 is about energy and introduces the concept of *entropy*, which measures the degree of order in something. The “What if?” question about changing the force of gravity is raised, and we learn how it would change the behavior internal to stars like our own. Stars burn hydrogen into helium, but how are heavier elements made? Most important is the matter of producing carbon nuclei (and oxygen) in stars, without which the basic chemical building blocks of life are absent. Once again, the strength of the *strong force* must be very fine-tuned. The disorder of the universe (measured as the total entropy) always increases, which implies that the initial state must have been very highly ordered (very low entropy). When entropy is low, there is plenty of *free energy* to drive processes forward, including life-producing processes. A very important point is made here: The countless billions of galaxies in our universe indicates extravagantly more free energy than would be needed for life to eventually exist. The amount of order “...is so abundant that it is difficult to believe that it is purely the result of chance.” That will return to be a deciding factor near the end of the book.

Chapter 5 begins with the immensity of the universe, but at its heart lies simplicity. Just as there is a *standard* Model for particles and forces, there is also a *standard* Cosmology that tells how the universe evolved. Lewis and Barnes narrate the steps as they “rewind the tape” of the universe back to the Big Bang, when the universe “...began dense and hot, a seething, roiling morass of particles of every kind.” The progression into inflation, dark energy, etc., eventually leads to galaxy formation, as well as speculation about the long-term future. At present we lack a theory of *Quantum Gravity*, which would unite General Relativity with Quantum Mechanics. As a result, we are moving increasingly into the realm of speculation.

Chapter 6 is aptly named “All Bets Are Off,” and says “...this is where things get very weird.” Speculation is not utterly random but is constrained by cornerstones such as *symmetry principles*. What are the requirements for intelligent life? “The problem is too complicated; we are really only able to scratch the surface. But as our physical theories improve, we may be able to discover the possibilities for life in these other, hypothetical, universes.” On the nature of time, they quote St. Augustine and then discuss how the arrow of time comes to be. After that comes simulated universes, including the computational tech-

nique of *cellular automata*. The closing words are “We find ourselves questioning our existence in a Universe with a nice set of physical laws, with the right masses and forces, the right kind of beginning, ... With so many potential ways the Universe could have been, we cannot ignore the apparent specialness of our existence.”

Chapter 7 presents Lewis and Barnes’ answers to a collection of questions and objections raised about fine tuning, for example “We’ve only observed one universe” or “There could be other forms of life.” Their explanations range across quarks, Bayesian probability analysis, and more. The final conclusion sets up three possible reactions about fine-tuning:

- a) Deeper knowledge of physics will someday explain the constants of nature.
- b) There is a *Multiverse*, so many other universes that one is sure to “get it right.”
- c) A Designer; the properties of our universe achieve the goals of its Creator.

Chapter 8 is where this all comes together, pursuing those three avenues. The structure is once again a dialog between our two cosmologists Geraint and Luke; it is slightly reminiscent of Galileo’s famous dialog to explain his theory, but here the two speakers really have different positions which they defend. This is what all readers are really interested in, but it took nearly 300 pages of background learning to reach this point. The reader who has done all that work will be rewarded by being able to follow their dialog explaining the various positions.

The “deeper physics” theme brings up Einstein’s dream of a unified theory. However, elegant equations (as in *string theory*) don’t necessarily imply reality. “The fact that something is described by an equation doesn’t mean that it is out there in the Universe.”

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The center of this chapter is devoted to discussion of the *Multiverse* notion. The inflationary epoch of the very early universe offers the chance for different domains to go their separate ways, vanishing beyond our horizon; that allows speculation about other universes. They acknowledge the principle known as “Ockham’s Razor,” by which unobservable predictions are discarded. *String Theory* (currently 11-dimensional) offers lots of variation; there is a *landscape* of 10^{500} possibilities. It turns out that’s not enough possibilities to find a probable match to the exquisite precision of our own fine-tuned universe. An infinite number of universes is the only available option. Considering infinity soon leads to ridiculous outcomes; one that they discuss is the notion of “Boltzmann Brains,” that is, a fully formed human brain (complete with memories) that pops into existence via a statistical fluctuation. With careful reasoning, Luke explains to Geraint the absurd impossibilities implied that way: YOU are not real but are merely a Boltzmann Brain. The notion of infinite universes produces that outcome. And most fatal of all: the Multiverse itself would have to be fine-tuned! That completely defeats the initial purpose.

The “big question” remaining is “Why does anything at all exist?” Luke explains “According to theism, a perfect being can answer these deep questions....”

They turn at last to option c), that our one universe was designed by a Creator; this section is labeled “the G word” which typifies the reluctance to consider God as an explanation. But it’s unavoidable, since all the other options have failed. The *Teleological Argument* by St. Thomas Aquinas is briefly synopsisized, although neither Luke nor Geraint use the term “first cause.” However, they acknowledge that the cause of the universe lies outside the universe. God is a *necessary Being*, the Universe is not. (It would have been nice to see a footnote to Lonergan here, but referencing Aquinas will suffice.) They go on to discuss what *necessary being* means.

The Dawkins argument in *The God Delusion* is reviewed and shown to be fallacious; also, *naturalism* is distinguished from and contrasted to *theism*. The problem of evil is always present: why didn’t a supposedly perfect God make a perfect universe? Geraint summarizes Luke’s position thusly:

“To you, the conditions were chosen; the dials were explicitly set to allow your existence. This universe contains good things like free moral agents and all that they can do and learn and appreciate. The presence of these qualities is not accidental, but reflects the intent of the creator, the person who set the dials.”

But the issue is still not resolved. Rather than cite the Christian slogan “we exist as a thought in the mind of God,” Geraint speculates that God might be just running simulations on a cosmic computer. Luke then points out that is even more contrived than the Multiverse, just moving the problem up a level.

The “big question” remaining is “Why does anything at all exist?” Luke explains “According to theism, a *perfect* being can answer these deep questions. Its necessary existence explains why anything exists. Its moral perfection makes its creation of a moral-agent-permitting Universe like ours more likely. However, this does raise more questions! For example, does the idea of a necessary being even make sense?”

As the cosmologists close up shop, what may occur to the reader is Spitzer’s observation that science *points toward* the existence of God, but a *little leap of faith* is still required.

This really is a fascinating book. The physics in it is first class, and Lewis and Barnes have some very original ways of making difficult concepts clear. They have faced the very important question of what does it mean that our universe is fine-tuned, and they have presented a variety of different explanations fairly. After hundreds of pages of strictly scientific discussion, the atheists will find no comfort in their destruction of the Multiverse excuse. Readers who are theists will be slightly disappointed that they won’t supply that *little leap of faith*, but will certainly appreciate how close they have come on the strength of physics alone.

I recommend this book to college students and above. It certainly helps to have taken some math and physics courses, but a non-technical reader who is diligent and willing to study new material will benefit greatly from it. ■

Purchase *A Fortunate Universe: Life in a Finely Tuned Cosmos* on Amazon at:

<https://www.amazon.com/Fortunate-Universe-Finely-Tuned-Cosmos/dp/1107156610>.