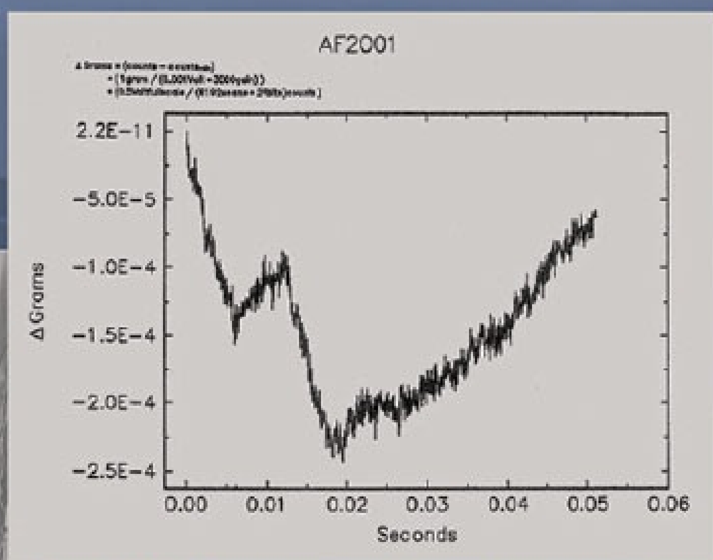
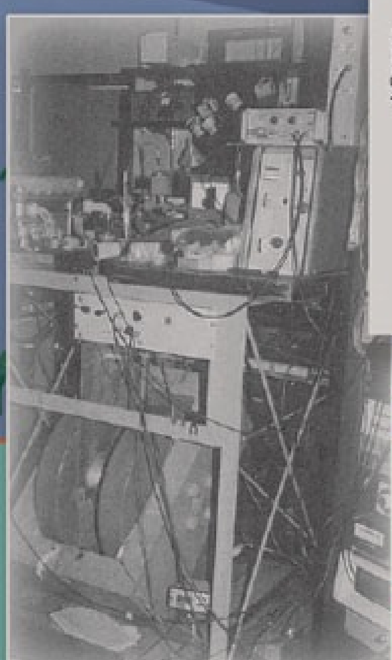
HOW TO BUILD A FLYING SAUCER
(AND SAVE THE PLANET)

THEORY • TECHNOLOGY • PROOF

Dr. Frederick Alzofon





Commentary and Title
David Alzofon

How to Build a Flying Saucer

(And Save the Planet)

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Theory • Technology • Proof

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How to Build a Flying Saucer (And Save the Planet) – Theory • Technology • Proof

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First Edition

For my Dad, and the first flying saucer generation

COVER ART AND THE KLAF RAKNAR STORY

Cover *illustrates "Theory," with selected pages from the experimental notes of Dr. Frederick Alzofon, "Technology," with a photograph of the apparatus used in the 1994 experiment, and "Proof," with a chart from the 1994 experiment showing weight alteration in a metallic specimen subjected to the prescribed fields.*

Background *illustrates hitherto unreported sighting of a tipsy saucer, 300 feet wide, hovering over a lonely stretch of interstate highway between Death Valley and the eastern Sierras in the early 1970s (p. 139).*

Klaf Raknar *was a legendary lab cat whose name represented an individual ("Klaf) and a family tree ("Raknar"). In the early 1970s, after a distinguished career at the Sleep and Dreams lab at Stanford University, Klaf retired to pursue his true passion, sniffing flowers and grass in our backyard in Menlo Park. Stanford generously said they would take care of all of Klaf's veterinary care after he left the lab. As shown in the logo, Klaf had distinctive half moon eyes, owing to surgery he underwent while serving as a lab cat. The surgery came with another side effect: chronic sinus infections. After several years of battling these, Klaf was hovering on the brink of death, so we sadly said our goodbyes and took him back to Stanford. But fate had something else in mind for Klaf. Miraculously, a visiting British surgeon touring the Sleep and Dreams lab saw him the day before he was scheduled to be euthanized and offered to use him to demonstrate a new microsurgery procedure normally reserved for human beings. The next day, Klaf entered the operating theater at Stanford Hospital. A week later, he came home, good as new. Clearly overjoyed, he stepped from his cardboard box, acknowledged us with a "meow," then shot through the house and headed straight for the garden to sniff his favorite flowers. Klaf Raknar Media Works strives to keep Klaf's memory alive as* ***a*** *symbol of science, hope, and providence.*

"A Taoist Toast" photo credit, *Susan O'Neill (November, 2016). Taken on Mt. Palomar about midway up the mountain between Palomar Observatory and Palomar Gardens, site of UFO contactee George Adamski's first sighting in Year Zero of the modern flying saucer era, 1947, which included Kenneth A. Arnold's sighting at Mt. Rainier and the Roswell incident. All in all, an appropriate site to toast the end of the old era and the beginning of the new, when, we hope, top and bottom of the mountain shall meet.*

Graphic art *by Frankie Frey (chameleongraphicssite.com)*

ACKNOWLEDGMENTS

No book is an island.

First and foremost, I thank my father for bequeathing me his love of science, mathematics, and Western culture. But his greatest gift was hope. Never was the story of Pandora's box truer than it is today. Sadly, Pandora's tale does not often end well. As Shakespeare said, "The miserable have no other medicine, but only hope." My father, on the other hand, gave hope a name and backed it with hard science. This was far too precious a gift to allow to die with him, and this book was written to ensure that it might be passed on to others in time to make a difference. My mom's role in supporting my dad must not be forgotten either.

I am deeply grateful for the help of Barbara Wolff, Einstein Information Officer, Albert Einstein Archives, The Hebrew University of Jerusalem, for providing photos of my father's 1955 letter to Dr. Einstein, which I thought had been lost to history. The letter was vitally important in establishing a timeline for my father's meeting with Dr. Feynman at Caltech and showing the evolution of his thought concerning gravitation.

It may not be possible to tell a book by its cover, but graphic artist Frankie Frey was able to create a cover that was a worthy expression of the concept. More than that, Frankie's decades of experience in publishing influenced the interior design as well, and her editorial experience made her a valuable judge of the content. Clearly she was motivated and inspired by the mission, and it is difficult to put into words how important that is to an author struggling to climb a Mt. Everest of a manuscript.

Thanks to Dave Conklin for providing morale-boosting iconoclasm during the Stanford years and beyond.

Sincere gratitude to Dr. Han Kim for being a good friend, a great raconteur, and a true humanitarian.

Last, but far from least, I would like to thank my significant other, Susan O'Neill, who was a forever faithful and supportive friend and ally throughout twenty years of this saga. Susan knew my father well and witnessed every chapter of the Silicon Valley era investor search, only a fraction of which is mentioned here. Her advice and feedback was always thoughtful, intelligent, and valuable. Her patience, too, was plentiful. When I say that I'm glad this project is finally at an end I know that she will more than second my emotion.

OVERVIEW OF CONTENTS

CONTENTS (COMPLETE)

Book I – What Is Gravity Control and Why Does It Matter?

by The Editor

Book II – Theoretical Foundation and Applied Technology

by Dr. Frederick Alzofon

Postscripts

The thing that hath been, it is that which shall be;

and that which is done

is that which shall be done:

and there is no new thing under the sun.

— Qoheleth

BOOK I

What Is Gravity Control And Why Does It Matter?

The behavior of the gravitational force and its inseparable companion force, inertia, are well-understood, but their physical origin remains a great mystery. Both have proven uniquely impervious to any attempt at direct alteration or interference ever since the dawn of history. If a reputable scientist had somehow managed to find a way to manipulate them directly with present technology, then surely his accomplishment would have been celebrated by all. It is simply not credible that such a breakthrough would have been left sitting on the shelf in plain sight, gathering dust, for thirty-five years.

Yet that, this book contends, is exactly what happened.

Prior to the matter of theory, technology, and proof, then, comes one of credibility. Book I *goes some distance toward establishing this by recounting the history of the invention and how and why it was ignored. The balance of* Book I *investigates what it means to society if gravity control is real: how it will open the space frontier, bring about a second Industrial Revolution, and save the planet. UFOs in general and flying saucers in particular enter the discussion tangentially, as exemplars of the technology in action.*

— The Editor

PART I

Doomsday or the Stars?

We shall need a substantially new way of thinking if humanity is to survive.

— Albert Einstein, 1954

Chapter 1

DISCLAIMER

Please Read the Entire Disclaimer First; Do Not Skip!

THIS BOOK IS INTENDED TO BE READ AS A WORK OF SPECULATIVE SCIENCE: THE PREMISE AND THE CONCLUSIONS IT CONTAINS MAY OR MAY *NOT* BE TRUE. The Editor (David Alzofon) encourages the reader to **remain skeptical**.

The Editor readily acknowledges a bias in favor of Dr. Frederick Alzofon's theory of gravitation and the technology of gravity control derived from it. Dr. Alzofon was the Editor's father, which makes the Editor's judgment suspect, or well-informed, or both. The reader must be cautioned that *proof* of the theory and applied technology have yet to be established. Indeed, the primary goal of this book is to inspire readers who possess the expertise and wherewithal to *duplicate* the experiment the Editor's father conducted in 1994. If successful, a repeat of the 1994 experiment would remove all doubt about the efficacy of the technology. It would also confirm the validity of the physical theory behind it and touch off a second Industrial Revolution. Dr. Alzofon considered the experiment a success, and, based on a lifetime of experience, the Editor accepts this judgment, while at the same time acknowledging that he (the Editor) is not qualified to render an expert opinion.

The positive effects of a successful repeat of the 1994 experiment can hardly be overstated, which explains the Editor's zealous advocacy of the theory, technology, and proof presented here. However, no amount of confidence or rhetorical fireworks constitutes scientific proof. Therefore, a reader interested in duplicating the experiment must heed the following warning and proceed with caution:

THE EDITOR, AUTHOR, AND PUBLISHER MAKE NO GUARANTEE OF SUCCESS FOR THE TECHNOLOGY DESCRIBED HEREIN, AND DO NOT ASSUME AND HEREBY DISCLAIM ANY LIABILITY TO ANY PARTY FOR ANY COSTS, LOSS, DAMAGE, OR DISRUPTION CAUSED BY ERRORS OR OMISSIONS IN THE TEXT OR BY FAILURE OF THE TECHNOLOGY TO PERFORM AS DESCRIBED. **THE READER(S) ASSUMES ALL RISK FOR COSTS, LOSS, LIABILITY, DAMAGE, OR DISRUPTION OF ANY KIND**, SHOULD THE READER CHOOSE TO ACT ON INFORMATION PROVIDED HEREIN OR IN ANY WORKS DERIVED FROM THIS TEXT IN ANY MEDIA WHATSOEVER.

An additional reason for this warning is that the author has no control over the quality or accuracy of the attempts of others to duplicate the experimental apparatus, which has a rather high bar of engineering precision. Because of the high engineering standard, **even minute and seemingly trivial deviations from the specifications provided herein are likely to produce failure**.

Anyone interested in replicating the 1994 experiment is *strongly* advised to seek expert assistance before investing in such an effort. We also advise seeking an independent evaluation of the science presented in *Book II* before proceeding. However, let the reader be cautioned that not all experts are equally objective: In some quarters of the scientific community, strong, even irrational prejudices are likely to be found. (*For clarification, please see pp. 199 – 208.*)

THE TECHNOLOGY DESCRIBED HEREIN HAS BEEN ON THE PUBLIC RECORD SINCE 1981, when it was published in a 33-page paper and delivered in a lecture as part of the proceedings of the AIAA's 17th Joint Propulsion Conference. The original paper has long been available as a download through the AIAA website. The theory and technology have been described several times in refereed journals and magazines since 1981 (*see p. 347 for list)*, and the 1994 experiment has been referenced in several publications. Nothing in this book can remotely be considered classified.

THE THEORY AND TECHNOLOGY DESCRIBED HEREIN WAS RESEARCHED AND DEVELOPED SOLELY BY DR. FREDERICK ALZOFON, A PRIVATE INDIVIDUAL. At his death, custody, copyright, and ownership of the material in this book passed to his heirs. None of Dr. Alzofon's work product is now, nor has it ever been the property of any corporation, government agency, or private individual other than Dr. Alzofon. All of Dr. Alzofon's concepts and discoveries in theoretical physics and applied technology are original and unique: none were borrowed or derived from the work of any other individual or group. The record supporting this, which is elaborated in the *Milestones* section of this book and elsewhere, has a continuous record dating back to the 1940s.

PATENTS: Dr. Alzofon filed a patent application for the technology described in this book in 1980. The patent application was turned down and went into suspension afterward. **PUBLICATION OF THIS BOOK DOES NOT CONSTITUTE A SURRENDER OF DR. ALZOFON'S PRIOR PATENT CLAIM**, especially since we believe ("we" being Dr. Alzofon up until the time of his death, his patent attorney, other experts, and the Editor of this book) that the application was treated prejudicially and denied for insufficient cause. (*See p. 363 for more information.*)

THE EDITOR, AUTHOR, AND PUBLISHER DISCLAIM ALL RESPONSIBILITY FOR ERRORS, OMISSIONS, OR CONTRARY INTERPRETATIONS OF THE MATERIAL CONTAINED HEREIN OR IN MATERIAL DERIVED FROM THE CONTENT OF THIS BOOK. The Editor has made diligent efforts to check all facts and accurately transcribe Dr. Alzofon's work from the original sources. Nevertheless it is possible, especially in a book of this nature, for inadvertent errors to appear. Errors may also have appeared in the original source material and gone undetected by the Editor. It is the reader's responsibility to verify any areas of concern with third-party experts. The author strongly recommends consulting a PhD in electrical engineering, preferably in microwave technology or electron paramagnetic resonance (EPR) or dynamic nuclear orientation (DNO), in any serious effort to replicate the experiment.

The Editor will make an effort to answer sincere technical inquiries addressed to info@klafraknar.com, **IF and ONLY IF** the writer sends verifiable contact information, including name, address, telephone number, title, company or educational institution, and purpose in writing. The Editor will not respond to correspondence that fails to provide this information. *No exceptions*.

NOTE TO ACADEMICS: PROCEED AT YOUR OWN RISK. Anyone advocating investigation of Dr. Alzofon's unified field theory in an academic setting should be forewarned that opposition, particularly among experts in general relativity, will be intense and not especially amenable to reason. Negative career consequences are possible, even likely, at least until verified, positive experimental results arrive from reputable sources. Proceed with caution.

THE FOREGOING WARNING IS NOT NECESSARY with respect to Dr. Alzofon's theoretical work in optics, heat conduction, and diffraction analysis by Sommerfeld's Method, all of which has been found as praiseworthy as it is innovative, and none of which has stirred up any controversy.

Chapter 2

ABOUT THAT TITLE

THE TITLE OF THIS BOOK—which was created by David Alzofon, *not* Dr. Frederick Alzofon—is a humorous homage to ’50s sci-fi and *not* a symptom of wearing my tinfoil hat a little too tightly. “Flying saucers” loomed large in film and magazines in the ’50s, thanks to the 1947 Roswell incident, a host of sensational sightings, and a wave of Hollywood films. Purple prose went with the territory. At the same time, I must confess, the title is sober and serious, because if we’re correct, a flying saucer will be coming to a garage near you—perhaps even your own—sooner than you think, and yes, the technology behind it will play a role in saving the planet. Let me emphasize, however, that these predictions are guided by *science*, not science-fiction.

If you’re a physicist, you will no doubt find such claims nothing short of ludicrous. And that is good, if the momentum of your skepticism, curiosity, or contempt carries you through the first few chapters of *Book I* and on into *Book II*. For now, let me simply say that if you came expecting a sci-fi saga, you will be severely disappointed. But if you came hoping for real science that challenges your fundamental beliefs, you’ve come to the right place.

“But wait, *real* science has proper channels, and this isn’t one of them,” certain members of the audience will be quick to point out. “Proper channels” means peer-reviewed journals and books. The skeptical reader will no doubt be reassured to know, then, that everything *else* Dr. Alzofon wrote—including over forty papers and two other books—*has* appeared in peer-reviewed journals or in advanced books in mathematical physics for professional physicists (*see p. 351*). Aerospace companies have staked millions of dollars on his credibility. The theoretical side of his gravitation theory has been published in peer-reviewed journals, and the rationale and design for the technology was laid out in abundant detail in a paper he gave at the 17th Joint Propulsion Conference in Colorado Springs in 1981 and four other publications thereafter (*see p. 347*).

But as you will see, something funny happened on the way to *testing* the technology. The proper channels failed, and that’s what led to this book. Regrettably, after fifty-six years of petitioning the “proper authorities” for a hearing, sidestepping them entirely was the only recourse left.

Other readers may have seen the curious title of this book and looked inside expecting nothing more than an entertaining diversion, yet another sightseeing trip down the UFO highway, which has a lot of interesting twists and turns but never seems to get anywhere. But by now, if you’ve read the DISCLAIMER, you no doubt realize that this book is unlike any other on the topic of UFOs, *because its truth claims are supported by known and accepted science and can be verified (or falsified) in a laboratory*. We have a specific destination in mind, as well: If the science in *Book II* holds up, then what you're looking at will not only remove UFOs from the arena of science-fiction and ground them firmly in science fact, it will be ground zero for the greatest technological revolution in human history.

But first, an apology is in order. No scientist would have frowned on the title of this book *more* than the one whose name is on the cover—my late father, Dr. Frederick Alzofon. Science was his profession and his lifelong passion, and he would have considered it an affront to characterize his work in less than dignified terms, especially if it was going to be read by his peers. As an acknowledged wizard at applied mathematics and a scholarly recluse, he was light years away from the profile of a backyard inventor, such as the eccentric "Doc Brown" of *Back to the Future*. If he resembled any fictional character at all, it might have been Zefram Cochrane, the inventor of warp drive in *Star Trek* lore. One big difference: Warp drive, as far as we know, is fiction, while gravity control, we assert, is *fact*.

The title of this book intentionally sets a tone of sensationalism and controversy, both of which were anathema to my father. He always couched his assertions about gravitation in the cautious optimism we expect of professional scientists and would have been outraged to see "flying saucer" and "save the planet" in the title of any book with his name on it. When I asked why he didn't "go public" with his discoveries, he replied, rather drily, "What good would that do?" That question is about to be answered, it seems.

Some perspective on UFOs is in order, too. The trio of subjects that consumed more of my dad's time than any other were relativity, unified field theory, and gravitation, all of which he studied and researched continuously from the 1940s up until a month before his death in 2012. Professionally, he opened new frontiers in optics and heat conduction, but it is for his painstakingly formulated and innovative unified field theory and the invention of gravity control that he would no doubt want to be remembered. The UFO connection came along *much* later, long after the publication of his 1960 paper on gravitation, and it was more or less a footnote to the story. He was as astonished as anyone else when his calculations led to the same numbers recorded during an Air Force encounter with a UFO in 1957 (*see p. 109*). He was, however, openminded enough to examine the evidence.

So I *am* guilty of making a headline out of a mere footnote to my father's career, and for that I apologize. If he were still alive, I can imagine the wrath that would rain down on my head for having done so. But the liberties I have taken are not without justification. The dignified, cautious approach that characterized all of my father's efforts to bring gravity-control technology into the mainstream since 1960, and especially since 1981, yielded precious little in the way of tangible results. Meanwhile, an ominous global environmental crisis has steadily gathered momentum, and unless something is *done* about it, and *soon*, the consequences will be catastrophic. But there's hope: If he was correct, an astounding and effortless solution lies between the covers of this book. Under the circumstances, a sensational bid for attention not only seemed warranted, it seemed *imperative*.

Noted skeptics Carl Sagan and Isaac Asimov scoffed at UFO reports and threw cold water on eyewitness testimony, including that of trained observers—pilots, police officers, military personnel, radar operators, and astronomers—by invoking the dismissive phrase, “Extraordinary claims require extraordinary evidence” (note the chin lift, the nose elevation, and the smirk that accompanies this pronouncement). Since knowledgeable, experienced eyewitnesses, photography, videography, radar echoes, fragments of exploded UFOs, and landing-gear impressions made by unidentified objects weighing many tons didn’t rise to the level of “evidence” for these spokesmen of the scientific community, one was left with the impression that only the proverbial flying saucer landing on the White House lawn would satisfy them. And what were the chances of that ever happening?

Before publication of this book, *not good*. But now? Well, the chances are excellent, if our central thesis is correct. With the blueprint for a propulsion system based on gravity control offered in this book, a crack engineering team *could* build a flying saucer and land it on the White House lawn within a year, and it would do virtually everything that UFOs have been doing all these decades. But that saucer has yet to be built, so what evidence do we have *now*, today, of the kind that might persuade a Carl Sagan or an Isaac Asimov to roll up their sleeves, go into the laboratory, and make a bid for science history?

The cover mentions three: **First**, the theoretical foundation of the new technology, which meets all the rigorous criteria for a scientific theory; **second**, a detailed design plan that would allow any competent engineer to put the propulsion technology to the test; **third**, a record of experimental success in 1994. The theoretical physics and the applied technology were devised by a professional physicist with impeccable credentials and a track record of solving insoluble problems in aerospace technology and applied mathematics. As for the experiment, the instruments tell the tale. Incontrovertible proof will come when a reader of this book is able to duplicate the results of the 1994 experiment and publish them in a mainstream journal.

What about flying saucers? Why mention them at all?

They are evidence of a *fourth* kind, because it turns out that a flying saucer (or any nonaerodynamic UFO with axial symmetry), is the most efficient embodiment of the technology described in this book. The existence of thousands of reports accumulated over decades, perhaps centuries, of vehicles shaped like saucers, spheres, or equilateral triangles zipping around the skies in the *exact* manner predicted by my father’s theory, while emitting *exactly* the same electromagnetic signature he derived through independent calculations in the late 1970s, is either one *hell* of a coincidence or what one might call some mighty interesting corroborating evidence.

It’s hard to say whether or not any of the above would have inspired arch-skeptics such as Carl Sagan or Isaac Asimov to accept the challenge and take our blueprint to the lab. Probably *not*, we would surmise, and not because the evidence is unconvincing, but because some scientists simply have no stomach for what it implies. Like it or not, they have more in common with Galileo’s nemesis, Cardinal Bellarmine, than with Galileo, who wrote the following to fellow astronomer Kepler in 1610:

> *What do you have to say about the principal philosophers of this academy who are filled with the stubbornness of an asp* [sic] *and do not want to look at either the planets, the Moon or the telescope, even though I have freely and deliberately offered them the opportunity a thousand times? Truly, just as the asp stops its ears, so do these philosophers shut their eyes to the light of truth*.

If you're a member of the academy, you will find this analogy unfair and unflattering. No doubt, then, you will be more than willing to prove it wrong by accepting the challenge and taking a "look through the telescope," that is, running the experiment outlined in *Book II*. Or *not*, if you're content to let someone else do it and perhaps collect an easy Nobel Prize, scientific immortality, and a few billion dollars. After all, opportunities like this come along every day, don't they? And there's that little thing about saving the planet, too.

This book throws down the gauntlet. The decision whether or not to *act* is up to you. And by "you" I mean the readers in the audience with a thirst for truth, the desire to make a mark on history, and the wherewithal and training to accept the challenge, whether or not they are members of the academy.

Everyone else, please enjoy the ride.

Lastly, a note on style: Since this is a rather long book, readers are likely to skip around in it. With that in mind, certain points have been repeated in different words in different chapters. Faced with a choice between annoying some readers or failing to reinforce our points, a bit of repetition seemed to be the lesser of two evils.

Chapter 3

ENVOI

THE TERM *ENVOI* (Fr. *dispatch)* refers to a brief statement at the *end* of a poem, such as the last twelve stanzas of Chaucer's *Troilus and Criseyde*, in which the poet steps to the front of the stage to soliloquize on the purpose of his work in the grand scheme of things, often expressing a wish for the future.

Why, then, has our *Envoi* elbowed its way to the front rather than politely waiting its turn at the back?

Because it couldn't wait. The Editor's wishes for the future of the book need to be heard *now*, before a host of distracting topics steal the show, such as UFOs, aliens, particle physics, Albert Einstein, Richard Feynman, and an assortment of academics, bureaucrats, and billionaires, all of whom meet up—*Star Wars* cantina-style—in the tale about to unfold. The noise and confusion generated by this unlikely menagerie will undoubtedly distract from what should be our central focus: *the clear and present danger of climate change*.

Your intrepid Editor's concerns over global warming ratcheted up to a white heat with two ominous news bulletins that arrived from opposite ends of the globe in late January, 2016 (it is now December). The first was from Greenland, where a gigantic meltwater pulse had been detected in Disko Bay. The end of the last Ice Age was heralded by a similar event. The second came from Antarctica, where a new study confirmed that the Totten Glacier—a block of ice three-quarters the size of Texas—is melting from below. As Totten goes, so go the rest of East Antarctica's glaciers.

The culprit in both cases is warming seawater intruding below the ice. The inescapable conclusion is that climate change is gaining momentum, and not in nice, easy increments, but by geometric leaps and bounds. In the months since then, more and more reports of a similar nature have been gathering like storm clouds on the horizon. As soon as one dismal story exits the front page, another even more dire bulletin takes its place. It is literally impossible to keep pace with the rising tide of bad news.

When the Ghost of Christmas Yet to Come stood over the trembling form of Ebenezer Scrooge and pointed grimly to a tombstone bearing Scrooge's name, the old miser knew that at long last he must decide whether to pay heed or perish. And now, it seems, we, too, must choose, for "if these shadows remain unaltered," then sea levels will be rising up to 22 feet in the northern hemisphere in the not-too-distant future. But before Manhattan real estate feels the pinch, or renowned climatologist Rush Limbaugh suspends his show to go home and bail water at his Florida estate, or the plutocrats and their kin rush off to their ranches in Montana or Honduras, or quietly take up residence in their luxuriously appointed underground bunkers, 1,400 *gigatons* of crystallized methane trapped in the permafrost and on the floor of the Arctic Ocean will gasify, bringing about what scientists soberly call "an extinction event." There are signs that we are already at the onset of this fatal development.

So here we sit, lounging comfortably in our rattan chairs on the deck of the Titanic at five minutes to midnight, with a billion stars dusting the sky overhead and a silky ocean as smooth and black as India ink stretching flat and silent to the horizon. The chill breeze that brushes our ears is more noticeable than the engine quietly purring below decks or the hull knifing through the icy water over the railing and fifty feet down. It all seems so serene, so tranquil. What could possibly go wrong?

But what was that? Did you feel that shudder rock the frame of the entire ship?

Let me speak to you as if you are an intelligent person and not, say, a cranky oil billionaire or one of their well-heeled friends in Congress who will be heading for a lobbying job as fast as they can get out through the revolving door. Everyone is waking up to the fact that climate change is *here*, it is *now*, and its effects are growing at an alarming pace. Even the Pentagon, whose mission is to mark, measure, and cope with threats to national security, acknowledges that climate change is making the world a more dangerous place and will tend to drive events that way for the foreseeable future. Congress's response? They forbade the mention of climate change in Pentagon documents. Smart.

In short, everyone who doesn't have their head buried in the sand knows we're in trouble—*big* trouble. We are dangling over a bottomless pit, yet we feel helplessly trapped in a technological paradigm based on fossil fuel. We *require* energy-packed hydrocarbons to stay warm, move freely and quickly from here to there, light the streets at night, keep the economy churning, and provide all manner of good things that we, like drug addicts, will *never* sacrifice, even if it means our extinction. The petrochemical industry, which profits mightily from the standing order of business, resists our feeble efforts to throttle things back a notch, while relentlessly pursuing the Eleventh Commandment—"Drill, baby, drill!"—as if it were a categorical imperative to party till dead.

Plainly, there is only one way to escape this dilemma: a paradigm shift. Hamstrung legislation or a new philosophy of frugal living won't do. Solar and wind have some effect, but what we need is a new *technology* that overturns the old and leaves us better off than before.

And what would this technological wildcard look like? It would be green, and it would spread far and wide without waiting for treaties, conferences, or government permits. In a matter of years it would dilute the use of fossil fuel and soon all but eliminate it. The new technology must go further than wind or solar. It must *transform* transportation and industry, the big hydrocarbon burners that for the most part remain untouched by alternative energy sources.

At the same time, it cannot cause any economic pain, *especially not to the petrochemical industry*, which, like the medieval Church, sits astride the world with its hands on all the political and economic levers, ever vigilant and ready to counter any impedance to the flow of profit.

A pleasant fantasy, you say, but completely impossible?

Surely you're aware that people always say things like that just before a paradigm shift:

Doesn't everyone know that the Earth is flat? Or that whale oil and kerosene will light our street lamps forever? That the telegraph is the ultimate form of communication, the automobile will never replace the horse and buggy, a heavier-than-air flying machine is impossible, and the notion of sounds and images transmitted through thin air is pure science-fiction?

I can remember a time when experts were telling us that color TV would never be. When color TV arrived, they said that a flat-panel monitor was impossible—until a month before it debuted in 1988. And after each "fact" fell like a shattered window, the skeptics who had avowed them with the smug certainty of a Christian holding four aces had vanished and opened up shop elsewhere, because the skeptics are *never* the dreamers who change reality. They are the ones who catch up after the fact, saying, "Any fool could see that."

All of the above notions of reality were pillars of truth until they were struck down by scientific lightning. This book may contain one of those lightning bolts, a hitherto unknown technology that experts have declared not just improbable, but *impossible*, one that will turn civilization in a whole new direction, opening the space frontier to private enterprise, transforming terrestrial transportation and infrastructure, and launching an economic boom that will still be going strong two hundred years from now. At the same time, it will bring about an evolutionary advance in our perception of ourselves and our place in the cosmos that will, according to some futurists, augur for peace, not war.

Wouldn't a rational world *rush* to embrace such a desperately needed new technology?

A *rational* world, *yes*, but *our* world? Alas, the answer is "No." That is a part of the story we will come to presently. To lay it out now, chapter and verse, would grant it more importance than it deserves. All that needs to be spotlighted here are three key dates: 1960, 1981, and 1994.

In 1960, my father, inspired by a conversation with Richard Feynman at Caltech in 1954, published his first paper on the origin of the gravitational force. At the time it attracted the attention of the U.S. Air Force, which was investigating claims by Soviet physicist Kirill Stanyukovich that the U.S.S.R. possessed a gravity-control propulsion system. These claims proved to be false; they were probably a trial balloon launched to test whether or not *we* had such a thing. (Conspiracy theorists note: If we had such a technology, the Air Force would probably not have met with my father in 1960.) At the meeting, my father frankly confessed he had no idea how to turn his theory into applied technology, and their interest evaporated.

The question of applied technology continued to consume my dad for twenty years. In the late 1970s, he began to formulate an answer, and in 1981, he offered a detailed solution to the problem of gravity control at the AIAA's 17th Joint Propulsion Conference in Colorado Springs. The title of his thirty-three-page paper was "Anti-Gravity with Present Technology: Implementation and Theoretical Foundation." The paper is currently available online from the AIAA (*see p. 348*).

Thirteen years went by before his proposal was tested, *not* by academia or industry but by my father himself in an off-the-books experiment at a university in the Pacific Northwest in 1994. The results were, as he put it, earthshaking (*see p. 119*). He chose not to publish, but rather concentrated on obtaining funding to develop the technology. For reasons that will emerge in the text, the funding never came, and he continued to research and publish on other advanced topics in mathematical physics until his death in December 2012, at the age of 93.

If the results of the 1994 experiment are to be believed, a terrible price has been paid for the peculiar prejudice that has kept my father's technology from being tested for nearly forty years. It would be as if FDR had ignored the 1939 letter from Albert Einstein and Leó Szilárd warning of the possibility of a Nazi A-bomb. There never would have been a Manhattan Project and the war might have been lost.

Similarly, if the scientific community had heeded the 1981 paper or any number of other proposals advanced by my father over the years, then the war against climate change might have been won decades ago. The gigatons of methane hydrate on the ocean floor would be sleeping soundly, and we would be colonizing the Moon and Mars by now, instead of engaging in needless conflicts in the Middle East over oil that will, ironically, kill us all if we manage to keep it flowing.

Now, perhaps, it is clear why the *Envoi* belongs at the beginning and not the end. It is my fervent hope that the reader will simply read the story and the science ahead with an open mind and not succumb too early to the prejudices that have denied gravity control and the theory behind it a public trial in the only court that matters, the court of Nature. A private trial has already occurred twenty-three years ago, and it passed.

Temporary suspension of disbelief is a small price to pay, because if the thesis advanced here is true, then the future of the human race is *not* in the hands of politicians, bureaucrats, academics, industry leaders, and uber-rich "visionaries" who had their opportunity to act and failed to do so. Rather, the future belongs to *you*, the readers of this book.

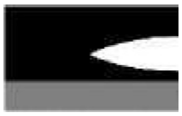
The clock has advanced while we've been chatting. It is midnight now, and our conversation comes to an abrupt halt as the ship lists to the side, sending two parasol drinks crashing to the deck at our feet. Your stomach churns, the steel bolts groan deep within the hull, and the lifeboats are already filled and lowered over the side. A chorus of panicked voices rises everywhere, and the violins strike up a mournful hymn. Your heart leaps into your throat.

In the midst of all this, someone grabs you by the arm and tells you there’s a way out.

Is this an offer you can afford to refuse?

Chapter 4

A SKEPTIC INQUIRES



Q (The Skeptic): I read your "Envoi."

A (The Editor): And?

Q: I'm not convinced.

A: I see. So you're not convinced that climate change is a problem...

Q: No, no, not that. You're not really claiming you've written a "how to" for building a flying saucer—as in UFOs, aliens, the Roswell crash, and all of that—are you?

A: Well, yes, that's essentially correct. But there's little about aliens *per se*. Instead we concentrate on what can be deduced from eyewitness reports of UFOs and flying saucers—photographs, videos, and so forth. Case studies are hopelessly varied and unverifiable, but what is *most* remarkable is that no matter where UFOs are seen, from Beijing to Pascagoula, they do seem to have certain traits in common, such as wingless hulls with axial symmetry. If we accept the premise that most witnesses are telling the truth, then this suggests a single underlying technology behind all the sightings.

Q: Which is what?

A: *Electronic control of gravity and inertia*. Most investigators acknowledge as much, but they're unable to extrapolate further. One physicist, however, was able to use data from a 1957 Air Force sighting *[see Chapter 18, p. 109]* to decode this technology. That physicist was my late father, Dr. Frederick Alzofon. This book describes the technology in enough detail for an engineer or physicist to duplicate it in the lab. With a robust and predictable method of gravity control in hand, building a saucer around it will be relatively easy.

Q: Who was your dad and why should I believe him?

A: He was a distinguished physicist and mathematician with a doctorate from Cal Berkeley, a thirty-year career in aerospace research, a track record of outstanding theoretical and practical achievements in optics and heat conduction, and numerous peer-reviewed scientific papers and books to his credit. Just look him up in *Who's Who in Science and Engineering*. You'll find all of this listed, and more.

Q: All well and good, but he's no Stephen Hawking, is he now?

A: In terms of notoriety, no, but he was one of only three creative geniuses I've known during a lifetime immersed in the intellectually rich environment of the San Francisco Bay Area and Silicon Valley.

Q: If he was such a genius, how come I've never heard of him?

A: Well, for one thing, his papers were *not* what you would call "light reading." They could only be understood by a rarefied group of professional physicists. And don't assume that fame is the surest token of genius. He was a great speaker and teacher, and he could be quite charming at neighborhood barbecue parties, but he was something of a recluse. He really had no friends, and he loathed publicity. I think it was because he considered both of them a distraction from physics. I never saw him spend less than six hours a day researching and writing, and often much more, seven days a week, fifty-two weeks a year, right up until his death. That's what he loved to do. Recognition, fortune and fame—he never cared about them. In fact, he thought they would ruin his life.

As for genius, I'm certainly not the only one who said that about him, but he always downplayed his intellectual gifts. For example, sometime during his years at Cal he took an I.Q. test and scored over 220, but he dismissed the results because he said he had studied the branch of mathematics they used to devise the test, "so it wasn't really fair," he said. I never once heard him condescend to *anyone*, especially about matters relating to physics. He seemed to consider it a test of his own ideas, whether or not he could explain them with some hand-waving and a few sketches on a paper napkin.

He had the same skeptical attitude toward his own theory of gravitation. Up until 1994 it was always, "*maybe,*" or if it was a good day, "*probably.*" Only after the experiments did I ever hear him say "*positively,*" but still, he was rather matter-of-fact about it. He just wanted to get the technology out the door where the world could use it for space exploration, industry, transportation, and construction. Getting it out the door, however, proved to be a problem.

Q: Did your dad work at Area 51 ?

A: No. He did have a Top Secret clearance from the 1950s through the 1980s, and he worked on classified projects for Lockheed and Boeing, but he never visited Area 51, let alone worked there. If the government really has a few crashed UFOs out there, they missed a good bet, because he could have helped them reverse-engineer the technology, and more important, he could have given them a theoretical basis for it so they could design their own. But that never happened. If it had, I'm sure I would have known about it sooner or later.

Q: So this is evidently a serious book.

A: Yeah. And a barrel of laughs, too.

Q: Is that why you chose such a ridiculous title?

A: Well, I wanted to get your attention. I wanted *you*, and skeptics like you, to leap on it like a pack of baying hounds. A noisy pack of hounds tends to draw spectators. And when you eventually collapsed from exhaustion, I figured there'd be enough curious onlookers left over to ensure that someone would actually go out and do the experiment. I wouldn't think that would be you, by the way.

Q: I don't know what to say. All I care about is truth and as far as I'm concerned, science is the only reliable method for discerning truth from falsehood.

A: Good to know. I guess we're on the same page, then.

Q: Is any of the information in the book classified?

A: No, no—quite the opposite! *All of it*, from the theoretical physics to the applied technology, was researched and developed by my dad while working alone, on his own time. With the exception of the report on the 1994 experiment [*see* Part VIII, *p. 283*], it has been a matter of public record every step of the way, from its inception in the 1940s until 2012, when he died.

Q: If there was anything to your father's theory, wouldn't Stanford or M.I.T. have *done* something about it?

A: That's a fair question, but a trifle naive. The short answer is "No. They'd sooner fall on their swords." I know this runs contrary to the popular image of science, but in this case at least, the record of the ivory tower—especially the part of it devoted to physics—is rather shabby.

His theory of gravitation first appeared in 1960. At the time, the Air Force was conducting a worldwide survey of gravitation research that included everything since Sir Isaac Newton. In the final report, the author of the survey, Dr. Maurice Garbell, said my father's theory was the only one he had encountered with a prayer of an engineering application, and that includes Einstein's general theory of relativity. But in a private conversation he said there wasn't a snowball's chance in hell that academic physicists would ever do anything about it. His assessment has proven correct for more than fifty years now. It's all quite unbelievable and most disheartening. I included some anecdotes...

Q: Such as?

A: Well, this anecdote isn't in the book, so I'll mention it here. I don't want to single out Stanford, so let's just say that scenes like this were commonplace [*see pp. 113, 114, 153, 181, 201*].

In the 1980s, my dad was visiting the campus of a major university where high-level research was being done and he found himself in a conversation with a physics professor. General relativity came up, and he offered the UFT as an alternative. After a brief back and forth, the professor's face flushed red, the veins in his forehead bulged out like knotted cords, and he shouted, "How *dare* you even *speak* of such things!" Then he spun on his heel and marched away, elbows pumping under the leather patches of his tweed jacket. He looked like he was conducting the Boston Pops Orchestra.

My father got this response from physics professors so often he began to call it "the chicken walk." Now maybe you think that the professor might have been justified, but still, does that sound like the dispassionate, reasoned response of a scientist?

Q: No, but your dad could have been full of crap, too, you know.

A: *Erm*, not likely. By that time he had been a professional physicist for thirty years. He had spent a decade in graduate school studying physics and applied mathematics and had earned his doctorate under some of the toughest professors in the world. He had taught relativity at the university level and conducted research at the cyclotron and published in *Physical Review*, among other places. Without question, he was at *least* as qualified to speak about "such things" as the professor, and probably more so. In 1954, for example, Richard Feynman was happy to debate the UFT with him for hours. Today's physicists wouldn't even *consider* stooping so low. They simply run away, ducking their heads and covering their ears.

Q: I'll grant you it seems odd, but why all the resistance? You're not going to tell me it was some kind of conspiracy, are you?

A: No conspiracy required. Upton Sinclair nailed it when he said: "It is difficult to get a man to understand something, when his salary depends upon his not understanding it."

Q: What do you mean by that? Why would anyone's salary depend on not understanding your father's theory? Sounds ridiculous.

A: Not at all. Thanks to many successful predictions, the GTR—Einstein's general theory of relativity—has acquired the status of settled fact by now. Generations of professors have staked their careers on it, and none of them wants to look at its blemishes anymore. The only theoretical discourse going on inside the ivory tower, especially at the level of funded research, concerns minor variations on the theme of general relativity, each of which are celebrated as breakthroughs. And along comes this upstart crow, this interloper, with his UFT, threatening to overturn the whole thing—*absolutely everything*. Of course they're not going to welcome something like that. You can question a period or a comma here and there, but you don't question the foundation of the system.

Q: No, you don't, because it *works*, and if it works, then it's true.

A: And that proves that the UFT isn't true? Are you sure about that? The results of the 1994 experiments suggest that academic resistance might have more to do with psychology than truth or the lack of it. At minimum, what happened in 1994 shows there's something worth investigating. And it's certainly worth taking a closer look, when you consider the stakes.

Q: Do you actually believe that aliens are visiting planet Earth?

A: Ha, there you go, hoping I'll start raving about reptilians in the White House. Why don't we forget about the aliens and talk about *burglars* instead. If you found footprints in your backyard leading up to your window, and the window latch was jimmied, and your jewelry was gone, might you conclude that your house had been visited by burglars, even if you didn't nab one?

Q: Yeah, but that's apples and oranges. Extraordinary *claims* require extraordinary *evidence*, you know.

A: Okay, how about fingerprints? Is that extraordinary enough?

Q: Where'd you get those fingerprints? At a UFO convention?

A: The U.S. Air Force, actually—you can read about it in Chapter 18 *[p. 109]*. My dad used hard data gathered during that sighting to unravel the mystery of gravity control. He was about ninety percent of the way there already, and the data from the sighting got him the rest of the way. I don't know if the sighting had anything to do with "aliens" or not, but it definitely had to do with the "fingerprints" of a real, nuts-and-bolts flying machine with extraordinary maneuverability. That much is certain. And by the way, all that data is on the public record. It was part of the Condon Report.

Q: Okay, so what do flying saucers have to do with "saving the planet"?

A: Do you mean flying saucers built by aliens, or flying saucers built by human beings?

Q: You're the expert—you tell *me*.

A: Well, again, forget about aliens. I'm talking about flying saucers built right here, on this planet, by *human* engineers. Machines like those would have a huge impact.

Think about the world before Kitty Hawk and after Kitty Hawk. Can you even imagine what the world would be like without aircraft? Non-aerodynamic flying machines that use gravity control will be like Kitty Hawk on steroids. They will do for space travel what airplanes did for global travel. But the effects will extend far *beyond* space travel to public and private transportation, construction, factory production, and toxic waste removal, among other things. Gravity control will transform the world.

But it's clean, that's the most important thing. As the technology spreads—and you can be sure it will spread faster than the microwave oven or the personal computer—it will dilute fossil fuel consumption, reducing greenhouse gas emissions while creating an unprecedented economic boom.

Q: Uh-huh. You won't be getting any love letters from Big Oil soon, *will you?*

A: On the contrary! I think of Big Oil as an *ally*, not an adversary.

Q: How's that even possible? According to you, gravity control will put them out of business.

A: No, not true. On the contrary—I want to make them richer than ever while ending their most intractable problems, namely dwindling resources, diminishing ROI, regulatory roadblocks, Mideast politics, and rising public hostility over air and water pollution. I expect Big Oil and the automotive industry to be among the earliest and most aggressive adopters of gravity control, because they can make mountains of *money* on it and they have the resources to lead the charge into the future *[see pp. 39 - 50]*. As their gravity-control-based businesses expand, their resistance to alternative forms of energy will shrink. Gravity control will have a synergistic effect on all forms of energy production.

Q: Well, I guess you won't be getting a rattlesnake in your mailbox, after all, because you sound completely *nuts!* Next I suppose you're going to tell me gravity control will give us *warp drive*, too. *"Make the jump to hyperspace, Chewie!"* Right?

A: No, not really. Gravity control has nothing to do with warp drive, or wormholes, or hyperspace. Those ideas sprouted on the fringes of general relativity. As far as my father was concerned, they were science-fiction.

There's this, however: The UFT *does* allow for faster-than-light travel. But nothing in the theory tells us how to accomplish it. One method might be to use gravity itself to accelerate the ship. This could be done by increasing the pull of gravity on the side of the ship facing the planet or star you wanted to travel to and decreasing it on the other. Eventually you would surpass the speed of light, but not instantaneously.

Q: What would faster-than-light travel look like? Would the stars smear like in *Star Wars?*

A: The stars in front would get a bit bluer and the stars behind would get a bit more red, that's all.

Q: Well, I'm still not convinced. Last I heard, physicists were saying that antigravity is at least five hundred years in the future, which is a polite way of saying "Only in your dreams."

A: If you take general relativity as your starting point, that's true. We *do not* take the GTR as our starting point, so we get to go places others can only dream of.

And by the way, please don't use that word, "antigravity." It's not accurate, because we are not generating a force in opposition to gravity. We *neutralize* the effect of gravity on the vehicle, so “gravity control” is better. Once our vehicle is weightless, we can choose between multiple methods of propulsion.

Q: And how do you do that? That is, how do you “neutralize” gravity, when no one else in history has been able to put the slightest dent in it? You’re talking about the Holy Grail of Physics, you know.

A: I guess you’ll have to read the book to find out. So fasten your seatbelt and flip the page.

Chapter 5

THE PUSHMI-PULLYU GAMBIT

HOW TO BUILD A FLYING SAUCER is really two different books by two very different authors: One was a scientific genius and a member in good standing of the World War II generation. The other is an ex-surfer and a child of the 1960s. They come from different worlds, and their writing shows it. *Book I* is full of blue sky and big dreams. *Book II* is all science, with a liberal sprinkling of equations and words such as “relativistic covariance,” “electron paramagnetic resonance,” and “cosmological constant.”

Confronted by the pushmi-pullyu[1] manuscript *of How to Build a Flying Saucer*, the all-knowing, all-seeing gods in Marketing would shake their heads and say, “Sorry. We can’t sell this beast unless we cut it in two. One book for the UFO nuts, and one for the physicists.”

As the surfer-dude-in-charge, however, I would be obliged to leap to my feet and exclaim, “Whoa, no way! You’ll kill it if you do that!”

“Really? And why is that, O washed-up surfer dude and relic of the 1960s?”

“Because, all-knowing, all-seeing gods of Marketing, the two books go hand-in-hand. One cannot do without the other.”

“Explain,” they would say with an air of condescension, as one might use when speaking to a child.

“Well, okay.”

And because, like, I *knew* this moment was coming, I’d rev up my PowerPoint projector, dim the lights, and commence to blow them away (as follows):

First slide: *Melting glaciers, polar bears adrift on ice floes, tornadoes, hurricanes, dust bowls*

Me, grabbing a can of beer, taking a gulp, wiping my mouth, and clearing my throat:

How to Build a Flying Saucer arrives at a perilous crossroads in history. Either we choose *survival*, and do everything in our power to resist climate change, or we choose business as usual, which is tantamount to choosing an irreversible path to extinction. Many different strategies for meeting the climate crisis are under consideration by world leaders now, but progress has been less than encouraging. The only measures on the table are woefully timid and face a headwind of resistance from powerful economic interests, especially in the United States. While the climate crisis gallops ahead at a hundred miles an hour with the wind at its back, we sit on the starting line and squabble about whether the starting gun went off or not. This is a recipe for disaster, and there is no solution is in sight.

Second slide: *A trio of flying saucers hovering in a cloudy sky, a distant city gleaming behind them*

Meanwhile, unbeknownst to the powers-that-be, a *third* alternative has been waiting in the wings—*a* game-changing technology called *gravity control*. The inventor was a maverick physicist with all the scientific credentials and professional achievements necessary to give his discovery credibility. In 1981, he offered the new technology to the world, and the world reacted... with thundering silence. The technology has remained on the shelf, unnoticed, and presumably unexploited, ever since.

Why did that happen? That's an interesting question, and we need an answer.

Third slide: *Albert Einstein*

The theory behind gravity control is called the UFT (unified field theory). It is heretical, at least if you ask a proponent of Einstein's theory of general relativity (GTR), the current reigning explanation of gravitation.

Fourth slide: *Heretic burning at the stake*

Heresy is a serious charge. Fortunately, the penalties have been somewhat reduced since Renaissance times. Nowadays you are simply ignored, especially if you dare to suggest something as radical as circumventing general relativity altogether. This bias is what has shut out research into the theory and applied technology for decades. Breaching the castle wall, I am now convinced, is quite impossible. Indeed, if it *were* possible, this book would never have been necessary.

Fifth slide: *Roadblock-busting scene from* Fast & Furious

That brings us to the "pushmi-pullyu gambit": It's all about breaking the roadblock. *Book I* includes a human interest story, and a blue-sky portrait of gravity control, but its primary purpose is to rile the mob, thereby attracting the attention of the priests, the nobility, and the royalty within the castle walls enough so that they might initiate some kind of action other than silence or ridicule.

Sixth slide: *Future world*

There's much more at stake here than winning a debate with a few professors. *Book I* shows that if successfully implemented, gravity control will profoundly change our daily lives, open the space frontier, and point humanity (and physics) in a new and favorable direction.

More important, as it spreads, it is likely to halt our pell-mell rush toward oblivion. And it will do so naturally, without a political struggle, without conferences, treaties, legislative debates, or regulations. Ironically, the new technology will win the full endorsement of industries that are hostile to alternative energy sources [*see pp.* *39* – *44*]. By pacifying these industries with greater-than-ever, *non*-petro-based profits, we expect to see resistance to solar, geothermal, and hydroelectric power begin to thaw. The cornucopia of wealth opened by gravity control will dwarf anything ever generated by fossil fuel, and it will be a public relations coup for the embattled petrochemical industry. The beneficial impact of these developments on society can hardly be overstated.

Seventh slide: $E = mc^2$

It is hoped that wild claims such as these, backed as they are by hard science, are likely to arouse a discussion that cannot be ignored. And when the skeptics say, "Show us the science," expecting us to fold our little clown-circus tent and catch the next train out of town, *Book II* steps in. Academia is free to ignore or ridicule *Book II all* they want, of course. But there's a catch: If they do, it leaves the door *wide open* to countless scientists and engineers *outside* the system to run with it, because *Book II* is designed to enable *anyone* with adequate training in electrical engineering to duplicate the technology.

To put things in a more positive light, the blueprint contained in *Book II* constitutes an attractive prospect for entrepreneurs seeking adventure and spectacular gain. Of course, an occasional oddball may be motivated by an anachronistic vestige of scientific curiosity, but there's no accounting for weirdos, you know.

Eighth slide: *Uncle Sam "I Want You" poster*

To be sure, most folks in the audience will have to bail out somewhere in *Book II*. It's too technical for the average reader. But that's all right: No-one's money will have been wasted, because along with the purchase price of the book you get an good story, a solution to all the longstanding mysteries of UFO flight, and most important of all: *a ticket to participate in saving the planet!*

How? Simple.

The goal of *How to Build a Flying Saucer* is to inspire someone to take action: to *do* something about the technology. Even if the reader is not a scientist or an engineer, they might have a relative who *is*. All the reader has to do is *tell them* about it. Or better yet, hand them a copy of the book. The 1994 experiment is not all that difficult to repeat. If they're interested, they will follow up. Eventually the message will reach the right person or persons, and it will be done. We're reasonably confident that if the experimenters know what they are doing, they will get the same result as my father did in 1994. And that's when the revolution begins. *[Or so we believe; please read* DISCLAIMER, *p. 1, and p. 35.]*

Ninth slide: *Landed flying saucer with aliens on the ground*

Finally a word about a sensitive topic, UFOs.

At first blush, the inclusion of flying saucers in the narrative—even, god forbid, the *title*—harms our credibility among scientists. There's no denying it, but that's part of the gambit. We sacrifice some credibility up front because we believe our case is strong on other counts. Also, if we *failed to* mention UFOs, skeptics would have quickly seized upon my father's articles for the *MUFON Journal* to impugn his credentials and involve us in an irrelevant argument, so I decided to tackle the problem head-on with a combination of humor (the title) and fact (the science).

As soon as that decision was made, I realized UFOs would *bolster* the case, rather than harm it, since their flight characteristics corroborate the theory and the technology, and vice versa. It also broadens the audience appeal of the book, since the whole world is interested in UFOs, but they're tired of rehashing the "Gee whiz, are flying saucers real or are they swamp gas?" question a thousand-and-one different ways. That's been going on for over seventy years, and it's likely to go on for another seventy. People want answers for a change, and this book provides them.

Tenth slide: *Gypsy fortune-teller with crystal ball*

Chapter 24, *The Top-Ten UFO Riddles*, reviews some baffling features of UFO flight, such as right-angle turns at supersonic speeds. Skeptics routinely dismiss UFOs because reports such as these seem to trample the laws of physics. My father took a different approach. Rather than use science to *end* the discussion, he used it as a beginning, that is, a tool of investigation. In other words, he *applied the scientific method* to the available data, rather than citing authority in order to curtail discussion and discredit witnesses whose testimony was inconvenient.

Such an approach may or may not bear fruit. In this case, it did. The day I heard him explain why flying saucers were saucer-shaped was the day the shroud of mystery vanished and I was able to clearly see that UFOs are nothing more or less than nuts-and-bolts machinery. All their characteristics, from the materials they are made of to their bizarre flight patterns—even the uniforms reportedly worn by their pilots—are integral parts of a single technology. The real mystery about UFOs is why their occupants are such avid players of "hide-and-seek." This is a topic for another book, but an opinion is offered in *Chapter 22*, *The (Gray) Elephant in the Room [p. 133]*.

Eleventh slide: *Thanksgiving dinner table with boorish uncle lecturing bored audience*

I hope that by the time you finish reading *The Top-Ten UFO Riddles*, you will have much the same epiphany I had. If nothing else, it will equip you to turn the weapons of science against those who have abused them in the past, such as the professional skeptics and establishment talking heads, as well as old Uncle Gradgrind, who shows up every November at the Thanksgiving dinner table just to destroy your God-given sense of wonder with his hyperbolic harumphs. Uncle Gradgrind knows the weight and measure of all things, but two intangibles he never seemed to grasp are that a sense of wonder often stands at the portal to scientific progress, and that *because* of science, today's "myth" becomes tomorrow's truth with uncanny reliability.

Twelfth slide: *Garage with flying saucer inside, engineer working under the hood, kids shooting hoops in the driveway*

Perhaps, if this pushmi-pullyu book accomplishes its purpose, we can finally give up *chasing* UFOs and *catch one* in a Silicon Valley garage instead.

What a wonderful world that would be.

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[1] *The pushmi-pullyu—a quadruped ungulate resembling a llama, with two heads at opposite ends of its body—appears in the children's book*, Dr. Dolittle, *authored by Hugh Lofting (1886–1947).*

Chapter 6

HOW WILL SAUCERS HELP?

OUR SUBJECT isn't *flying saucers* per se so much as *gravity control*, a revolutionary technology with wide applications beyond its obvious use in vehicle propulsion. The basis of gravity control is *dynamic nuclear orientation*, an obscure but well-documented process related to electron paramagnetic resonance (EPR), a technique used in spectroscopy. By combining dynamic nuclear orientation with a few other elements soon to be described, we can decrease or increase gravity (and inertia), as observed in the 1994 experiment. All of this is described in detail in *Book II*.

Gravity control will revolutionize space travel and completely transform the world as we know it.... But I see a crowd of engineers and physicists in the audience already on their feet and walking out, saying, "Ridiculous! Everyone knows that gravitational fields and electromagnetic fields interpenetrate without any effect on each other whatsoever. They never have and they never will, so you can keep your pseudoscientific claptrap about affecting gravity with electromagnetism—we're leaving!"

Well, hold on just a second, because we'd hate to lose the audience we value most before we even get started. What's more, we *agree:* Your objections are *more* than reasonable, and we recognize an obligation to give you answers in terms of known and accepted science. We will do that shortly, but out of consideration for audience members who don't have your background knowledge, shall we pretend, just for the sake of argument, that we've jumped five hundred years into the future, and the problem of gravity control has been solved? Call it "sci-fi" for now, if you like, but don't worry, we will catch up to you later, in *Book II*.

Now that we're in the imaginary world of a "thought experiment," I think we can all agree that the ability to manipulate gravity and inertia allows us to do some astounding things. We can exponentially improve the effectiveness of rockets, for example, because we can temporarily make payloads—whole vehicles, in fact—lighter than a feather. And if we can do that, we can launch a spaceship with "tons" of cargo into orbit with a can of hairspray rather than the customary thirty-story rocket. NASA's current estimate for lifting a Big Mac into space today is around $3,000. With gravity control, that cost will plummet to a few cents.

Gravity control lifts the cap on payload *size*, too, which makes it easy to build factories, colonies, and space-mining operations out there in the magnificent void, on the doorstep of the stars. And, since non-aerodynamic vehicles like ours are immune to the vicissitudes of weather, our launch window has expanded to any time, day or night, from virtually any location. Runways and launch platforms will be unnecessary. Any level patch of ground, even a clearing in a forest, will do. Exploration of the planets will get much, much easier, and space tourism will become a burgeoning industry overnight.

Back on earth, we can clap a low-powered gravity-control unit on an automobile and spectacularly increase its mileage. But why limit our thinking to wheels? We can now build saucer-like passenger vehicles propelled by small electric fans or jets, and fly to work in the morning at any altitude up to 14,000 feet, at almost any speed. If we install oxygen equipment and pressurize the cabin, the ceiling lifts to 50,000 feet or more. Not everyone will want to take to the air immediately, so the major auto manufacturers will be working overtime to create gravity-control vehicles whose flight characteristics fall within the comfort zone of those accustomed to having four wheels planted firmly on the ground. These vehicles will resemble the familiar "landspeeders" of the *Star Wars* saga.

High-performance vehicles such as we're contemplating will require sophisticated onboard electronics, which is a good thing for commuters, as well as the computer industry. For example, you might live on top of a mountain in the Rockies and commute to Los Angeles every morning on computerized autopilot in your personal saucer *(see Chapter 14, p. 75)*. If your saucer is in the shop, no problem—just call "Uber Saucer" and one will pick you up shortly. We estimate that the cost of a personal saucer will rapidly come out of the stratosphere and into the range of a light plane. Saucers without pressurized cabins will soon be in the same range as an SUV, and one day, even lower. The engineering on a small saucer is quite comparable to a modern automobile, and there are fewer moving parts.

The maneuverability of gravity-control vehicles will be unprecedented. With current technology, inertia compels airplanes to make wide, banking turns. When jet fighters ignite their afterburners, inertial resistance—the dreaded g-force—crushes pilots in their seats and contorts their faces like rubber masks. Too much g-force and a pilot will pass out, which can lead to disaster. But with inertial forces canceled, saucer pilots will make right-angle turns at supersonic speeds and *not feel a thing*, not even a little whiplash.[2] The aerospace industry should welcome these developments, because it means unprecedented funding for R&D, a flood that will go on for decades.

Of course, we can't leave split-second control of airborne gravity-control vehicles to fallible human beings. Instead, we'll put the details of flight in the hands of onboard computers linked to a central traffic-control network. With flight paths subject to security review and failsafe systems aboard, gravity-control vehicles will be less likely to be hijacked (or hacked) than modern commercial aircraft. The security issues are complex, but solvable. Suffice it to say, parents will be able to trust their teenagers to take the saucer for a spin on a Friday night, because the kids can determine the destination, but they won't have access to the gas pedal or the steering wheel.

As we all know, gravity and inertia are even more reliable than death and taxes. We instinctively take their influence for granted, and have done so ever since dawn of history. *Nothing* escapes the influence of gravity, not the trees, or birds, or blades of grass, the planets, the sun, the stars, or galaxies. Fundamental concepts such as “up” and “down,” “heavy” and “light,” are all dependent on an intuitive grasp of gravity and inertia. The way we walk or run or kick a ball, too. Nearly every engineering equation ever devised has to take gravity and inertia into account, which is why gravity control will have such a liberating, transformational effect on society. The chasm that separates the modern world from the horse-and-buggy era is *nothing* compared to the advances that will come with gravity control. I have painted a portrait of the future in *Chapter 14*, but the point here is simply that once gravity control technology begins to spread, it will quickly pervade every corner of society. From where we live and how we get around to the way we look at the stars above, *everything will change*.

And everywhere that gravity control is used, it will reduce our reliance on fossil fuels. *There’s* the rub.

If you can commute to work at fantastic speeds in a flying saucer propelled by a few small electric fans, how many gallons of fuel will you consume each week? You will need to charge the battery in your saucer, or exchange it for a charged unit at your destination, but the charging can be done with solar, geothermal, or hydroelectric power, and the mileage you get on one charge will be far greater than a conventional four-wheeled vehicle. Hybrid vehicles that use airflow to drive a turbine may relieve power requirements (*see pp. 48, 83, 162*). You’ll spend much less time traveling than before, because your saucer will get you to your destination at hundreds, if not thousands of miles per hour.

You will never have to hit the brakes for a traffic jam, either. Gravity control will tilt today’s five-lane highways into the sky, with slower lanes nearer to the ground and faster lanes higher up, and no stoplights anywhere, anytime. The low-altitude route into town might take longer, but the scenery will be spectacular, as you flit over mountaintops and through the canyons like a hummingbird. It’s inconceivable to us now, but in a hundred years, the asphalt and concrete freeways we take for granted today will likely revert to horse trails, public parks, and forests.

Natural power sources, such as wind, solar, hydroelectric and geothermal, have already reduced consumption of fossil fuel and will surely reduce it more in the future, but none of these alternatives have directly affected the use of fossil fuel in transportation. Gravity control will have a profound effect on carbon emissions by increasing miles per gallon while decreasing transit time and gradually edging out fossil fuel. If the batteries or capacitors that energize gravity-control vehicles are charged by natural power sources, such as solar and geothermal, then global fossil fuel consumption will soon diminish to safe levels. The decline in aggregate demand will be the same as if we had installed a mileage-saving electric propulsion system on the entire planet.

Skeptics will no doubt question how much energy it takes to induce the gravity-control effect. If the energy cost was high, our scenario would change from rosy to bleak. However, my father made some calculations in the lead-up to the 1994 experiment, and the figure was surprisingly low. This is because the technology resembles a pump: A certain amount of nuclear orientation is retained between microwave pulses, and since the pulses are cycled extremely rapidly, the effect builds up quickly and diffuses throughout the hull of the craft. On this basis, he predicted that the weight loss would be tentative at first and would suddenly cascade downward toward the gravitational equivalent of absolute-zero degrees Kelvin. He also predicted that the pumping action means a low-power input can be leveraged into a great weight loss. The cumulative effect he predicted *was* observed in the 1994 experiment. *(For precise calculations, consult p. 259, and the 1981 paper, pp. 4 and 5.)*

A complete solution to the problem of energy production is not within the scope of this book. Our purpose is only to spread a technology that will cut consumption of fossil fuel to safe levels within the near future, not eliminate it entirely. That's not the whole story, however. In a 1986 grant proposal, my father pointed out that his unified field theory has a direct bearing on future research:

> *Energy Production*
>
> *Since energy cannot be created or destroyed, the "production of energy" is a term which must refer to the conversion of one kind of energy into another, and useful, form of energy. Often the conversion takes the form of transforming a potential energy into a useful kinetic energy. For example, potential gravitational energy is transformed into electrical energy by use of falling water, or a gas under pressure may expand to cause motion of a piston.*
>
> *Approximately characterized, the history of energy generation has progressed from an original dependence on natural sources such as muscle and wind power, etc., to use of exothermic chemical reactions, then to production of electrical power, and finally to production of subatomic reactions (nuclear reactors, fusion, etc.). In general physical terms, this progression has been toward reliance on physical processes involving energy stored in smaller and smaller entities and greater power yields. But in each case, finding a useful energy transformation depends on knowledge of particular details of a specific process which makes the desired energy conversion possible. Only experiment can disclose these details; however, experiments cannot proceed without an adequate theory to guide the way. This theory must tell how to convert the random (or probabilistic) motion of atomic and subatomic entities to macroscopic, ordered motion for extraction of useful work.*
>
> *At this time, further progress in employment of subatomic processes for extraction of power is hampered by lack of understanding of subatomic processes. Although much is known from experiment, the theory of such processes is admitted to be inadequate. This lack of complete understanding is illustrated by the numerous infinities that result from modern theory, e. g. the concept of an infinite amount of energy stored in a "vacuum."*

> *It has been hoped that discovery of a unified field theory will resolve the difficulties inherent in present models of reality; it is the writer's contention that his unified field theory accomplishes this role, and will show how the desired energy conversions can occur*. [See p. 248 for context.]

He was probably entertaining notions of how subatomic processes might be utilized at the same time he wrote these words. During one of his rare visits to the Bay Area in the mid-1980s, we were driving north along a scenic stretch of Highway 280 near Crystal Springs reservoir, when he looked out the window and started to describe an idea he'd had for a new kind of power source, a kind of "nuclear transistor" that would boost the random electrodynamic activity of subatomic particles into usable energy, much the same way a transistor boosts a signal in a circuit. Over the years I frequently asked him whether he'd made any progress on the idea. In the 2000s he told me that he'd given up on it because it was impossible, but he never gave me a reason why. The notion of "free energy" was anathema to him, so perhaps it was the law of conservation of energy that ultimately convinced him that the "nuclear transistor" had no future. But maybe this anecdote will stimulate the imagination of readers who take the trouble to acquire a thorough grasp of the UFT (*Refs. 1a, 2, 4, 7, 9, p. 347)*.

While gravity control does not offer a direct solution to the problem of energy production, the advent of cheap and easy space travel, plus the ability to lift vastly increased payloads into space with far greater frequency, will open the door to new power sources here on Earth. The outlook for solar power has improved in recent years, but solar radiation encounters many impedances before it reaches the surface of the planet, including the angle of incidence, the air mass, dispersion from atmospheric gases, and the simple issues of day and night, cloudy or clear. In effect, solar cells at sea level are drinking from a solar soda straw. In space, no such impedances exist. There is as much solar power as one can gather, twenty-four hours a day. With gravity control, it would be possible to place enormous solar collectors at Lagrange points (orbital sweet spots) and collect enough solar power to run whole cities. The question is how to relay it back to Earth? Obviously cables will not do.

Conversion of solar energy to microwaves might be one way.

On November 7, 2013, gizmag.com reported a breakthrough in harvesting electricity from ambient microwave energy *already* available in the environment. This suggests that solar collectors could beam energy back to Earth in the form of microwaves, and the energy could be converted back into electricity at suitable collector sites here on the ground in remote places such as the Mojave Desert.

In March, 2016, the Space Solar Power D3 (diplomacy, defense, development) team, which included Dr. Paul Jaffe of the Naval Research laboratory, won an award from the National Space Society with their proposal for a system of space-based solar energy collectors (a seven-minute video is available at the National Space Society website, nss.org). The winning team included members of the Air Force's Air University, the Naval Research Lab, Northrop Grumman, NASA, the Joint Staff Logistics and Energy Division, the Defense Advanced Research Projects

Administration, the Army, and the Space Development Steering Committee—all respected organizations with impeccable scientific credentials.

My lack of expertise prevents me from speculating further, but the point is that gravity control would facilitate the development of the D3 plan, while it accelerates the pace of space exploration and opens new possibilities we can't even dream of within the current framework of space technology.

Saucer technology will help in other ways, such as allowing millions of people to view the Earth from space, which will change how we perceive humanity's place in the cosmos. Author Frank White explored the implications of this transformational experience in his book, *The Overview Effect—Space Exploration and Human Evolution* (Houghton-Mifflin).

The technology will also allow us to permanently remove toxic waste from the environment and protect the planet from rogue asteroids or comets. Cheap and easy space travel will reduce sources of conflict on earth by opening up a new frontier, reducing population pressure, stimulating the global economy, and replacing the culture of scarcity with a culture of abundance. All of these will rapidly transform society in a positive manner. (*Also see Chapter 11, p. 55*).

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[2] *See UFO Riddle #4, p. 149.*

Chapter 7

"IF"

"IF" IS A KEY WORD THROUGHOUT THIS DOCUMENT. *If* this were a legal document, every other sentence would begin with a qualifying phrase, such as *"If it works,"* or *"If it's true,"* or *"If the experiment is a success." "If, if, if"*—half the weight of the book would come from ink expended on the word "if." This would not only be bad writing, it would give the impression that we lacked confidence in what we're saying. So let us try to pack all our "ifs" into this chapter and omit them elsewhere in the book as much as possible.

As stated in the DISCLAIMER on page 1, the reader must treat the theory, technology, and proof given in this book as speculative—*well-informed* speculation, to be sure, but uncertain all the same—until someone successfully replicates the 1994 experiment or shows that the results were in error. Skeptics and advocates may fire at will until that day, but only when someone goes into the lab will there be anything of any real consequence to discuss.

If the redo of 1994 is a success, then our extravagant predictions are probably understatements—*pale* understatements of what's to come. *If the redo fails*, then we're wrong, and while failure is always allowable in science, we would expect to hear some harsh rebukes from the powers that be, first for daring to advance a serious challenge to the GTR without permission, and more important, because we had the audacity to put our case before the public after only thirty-six years of waiting.

There was no great joy in bypassing "normal channels," but the institutions and investors had made their verdict on my dad's proposals clear, and the stakes have now grown *far* too high to do nothing but sit on the beach and play bongos all day. The profit motive may have influenced the effort to find sponsors from the 1980s through 2012, but it had nothing to do with this book, which puts a trillion dollars of patentable technology up for grabs in response to the current crisis.[3]

If it works.

We strenuously object, however, to any critic who might vilify the book *before* the technology has been fairly tested. We have a simple, three-word response to critics such as this:

Do the experiment!

Any technically competent individual will find more than enough information in this book and in the publications listed in *Appendix* C to reconstruct the 1994 experiment and, we hope, *improve* upon it.

One more “if” to mention—*climate change*. Not everyone accepts the reality of manmade climate change, a few readers of this book included, no doubt. Let’s say for a moment that *if* you’re a skeptic and you are right—climate change is a hoax, it would have no effect on our message. Gravity control will still open the space frontier. It will still ignite a second Industrial Revolution. It will still enable us to remove toxic waste from the environment forever. All desirable and necessary outcomes if humanity is to move forward and evolve.

So, whether or not climate change is real, we still wouldn’t think of removing “Save the Planet” from the title. No, if it turned out that 97% of the world’s scientists were wrong, it would just add one more irony to a long list. After all, aren’t *we* advancing the proposition that 97% of the world’s physicists got it wrong?

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[3] *See Appendix F, p. 363, for patent information.*

PART II

Power Players

It's easier to ask forgiveness than it is to get permission.

— Rear Admiral Grace Murray Hopper, 1986

Chapter 8

BIG OIL

THE COMPANIES comprising “Big Oil”—including the automotive industry, which is treated in the next chapter—would be well-advised not only to *welcome* gravity control, but to zealously pursue its development. Why? Monster profits and a single, magical solution to all their most vexing problems. In addition, the new technology and the old have much in common. The leap from one to the other will pay for itself as fast as the market grows. Big Oil need lose nothing; all they need to do is ride the wave into the future and leave their current problems behind.

Today the petrochemical industry faces an existential crisis, like the whale oil industry that it replaced over a century ago. Gravity control or any of a host of alternative energy sources have nothing to do with the crisis, which has been building for decades. The threat comes from within, for if we continue to produce and consume fossil fuel as we have done in the past, the world will end, and that’s a terrible thing to do to a customer base. Oil company executives will share the same fate as everyone else in this scenario, a notion that doesn’t seem to trouble them at all right now. But once again, Upton Sinclair said it better than me: “It is difficult to get a man to understand something, when his salary depends upon his not understanding it.” (It’s safe to assume that this statement applies to women, too.)

The “Upton Sinclair method” of coping with the crisis is to deny that it exists and keep on truckin’ as long as possible, which in the case of fossil fuel is something like careening down a mountain road in an eighteen-wheeler with one’s eyes closed and one’s fingers in one’s ears. That seems to have been the strategy of Big Oil to date. But let’s be fair: *What else can be done?* Big Oil is relentlessly encouraged by the sheer magnitude of their enterprise and the profits and power it generates. All this is *real*, and it’s *today*. If the problem of climate change haunts them at all, they feel as trapped as anyone else, *because there’s no way out*. There is no alternative to fossil fuel other than energy sources that put people inside the industry out of work and cut into company profits.

Until now.

What Big Oil *must* see is that gravity control is completely unlike solar, wind, hydroelectric or geothermal power. Gravity control is *not* green energy, it is a gusher of green *money*. It is *not* a competitive energy source—rather, it offers a way to escape the inevitability of peak oil, diminishing ROI, regulatory interference, an increasingly hostile public, multibillion-dollar lawsuits and monster settlements for environmental catastrophes, not to mention the slings and arrows of Mideast politics. All of these trends converge on a bleak future for the oil industry, where it's getting harder and harder to extract less and less profit. There might be a momentary burst of profit as oil becomes scarce, but then what? Gravity control opens the door to an alternative future in which the major energy corporations not only survive, they diversify and flourish for a thousand years, far longer than they will if current trends remain unchanged.

First, let's play dumb and ask a basic question: What is the purpose of companies such as BP, ExxonMobil, and ConocoPhillips? Is it providing oil, coal, and gas to a hydrocarbon-hungry world?

No, it is not. Though appearances might make us think so, this kind of thinking is a trap.

Is it providing energy, then? BP's new slogan—"Beyond petroleum"—might indicate something like that, but Big Oil doesn't *behave* that way. But let's give credit where credit is due: BP's slogan is encouraging in that it indicates a willingness to "think different." "Thinking different" is essential if the major oil companies are to survive.

While "Providing energy is our business" is an agreeable idea, the CEOs and board members of all the major petrochemical corporations will probably agree that their companies really have only *one* purpose, and that is *to make a profit for the shareholders of the company*.

That's not some kind of big whoop. It's just not anything that corporations like to boast about, except perhaps in shareholders meetings and quarterly reports. But there's more than a lust for money behind this purpose. It's the *law*. Failing in the duty to maximize profit can leave directors and officers of the company open to being sued by shareholders.

So *making a profit* is the prime directive. And if the company could accomplish the prime directive without producing any oil at all, not one shareholder would shed a tear. As we'll see, this hypothetical proposition is not far from the reality offered by gravity control.

Proof? Hard facts?

Okay.

On July 18th, 2015, a fast-rotating, one-kilometer-long asteroid called "2011 UW158" passed within 1.5 million miles of Earth—close by astronomical standards. Spectroscopic analysis revealed that this tumbling space rock was mostly *platinum*. The price of platinum today is roughly $1,000 per *ounce*, or $30,000 per kilo.

If BP, ExxonMobil, Royal Dutch Shell, or Conoco Phillips were in the space-mining business instead of the riskier, costlier, and less profitable oil business, one or more of them would have bagged an easy $300 billion to $5 trillion from this *one* asteroid. And the solar system is *full* of asteroids. Where would the market be for that much platinum? The supply would inundate today's market, diluting profits, but *tomorrow's* market will be much bigger, because the new industrial economy of gravity control is going to dwarf the old. And Big Oil can lock in a sizeable share of the boom by diversifying its holdings today, thereby decreasing risk tomorrow.

To put things in perspective, the value of asteroid 2011 UW158—one asteroid—exceeds that of the world's annual production of coal, oil, and gas *combined*. But there's more. In the oil business, companies prize concentrated reserves that are easy to discover and easy to extract. Here, the entire reserve was discoverable by telescope (no costly exploration), and the entirety of it was concentrated in a one-kilometer package, ripe for the picking.

"But we're in the *oil* business, son—not the space business," say my Texas friends.

Well, I used to live in Houston, so I know where you're coming from. However, I feel obliged to remind you that back on earth, oil profits are *down*. According to the New York Times, Royal Dutch Shell's profit fell 56 percent in the fourth quarter of 2015 over the same period a year before: $1.8 billion, down from $4.2 billion during the same period in 2014. When Shell Oil abandoned Arctic drilling efforts recently, the reason had nothing to do with protesters who attempted to block their ships from leaving port. Rather, drilling in the Arctic Ocean for $90-a-barrel oil had become unprofitable in a $50-per-barrel market.

Now let's do an experiment: Put $5 *trillion* in one hand and $1.8 billion in the other, and then tell us which hand you like better.

While you're thinking about that, let me point out that there are more parallels between the space business and the oil business than it would seem at first.

An oil company sends scientists on costly exploratory expeditions to distant corners of the globe to probe deep under treacherous oceans in search of hidden natural resources. And when they find the buried treasure, they send ships and heavy equipment out after it. Substitute "spaceships" for oceangoing ships, and everything stays the same in the space-based resources business. What's hanging us up now is the $12,000-per-pound cost of space travel. With gravity control, however, that price will drop to less than the cost of an oceangoing exploratory mission. Rewards will go up, cost will go down.

Back to oil: The next step is to set up a drilling platform where workers will live for days, weeks, or months away from civilization. Divers don airtight diving suits—like spacesuits, right?—and plunge into a weightless environment where one false step means death. When you consider that in some corners of the globe, oil company workers are attacked by hostile "aliens," the parallels between the oil business and science-fiction become rather striking.

Platinum is far from the only resource in space. Aluminum is another, and the demand for aluminum in the new economy will be enormous, as it is the principal element in saucer hulls. But one of the most valuable and abundant commodities is "the oil of the future": *water*, which has been found on Ceres (a dwarf planet in the asteroid belt), and several moons of Jupiter and Saturn. Saturn's famous rings are mostly *water ice*, probably expelled from a global ocean on Saturn's moon, Enceladus. The volume of water on Jupiter's moon, Europa, *alone* is two to three times greater than all the water in all the oceans of the Earth! Even Pluto seems to have oceans of pure, four-billion-year-old water.

At this point you might say that the demand for oil is well-established and the demand for space commodities isn't. That's certainly true—*today*. But one must look at space-based industry the way John D. Rockefeller looked at Ohio oil in the 1800s: *as a colossal opportunity*. Space exploration is coming with or without gravity control, but slowly. *With* gravity control, it will be *galloping* at us tomorrow. Meanwhile, oil resources are dwindling, just as whale oil was in Rockefeller's time.

The fact that Big Oil is not in the space business today is irrelevant. Companies and agencies such as NASA, SpaceX, and Planetary Resources—which *have* staked a claim in space exploration and space-based business—had to sit on their hands and watch asteroid 2011 UW158 cartwheel by in July, 2015, because they didn't have the technology to intercept it and extract the treasure. Gravity-control technology does several things that are impossible with present technology: First, it brings space exploration costs into a range on a par with oil exploration costs. Second, it enables spaceships the luxury of maneuvering in deep space without consuming prodigious amounts of costly fuel. This in turn makes it possible for a space vehicle to dock with a cartwheeling mountain of platinum, extract tons of booty, and take it back to Earth or the nearest space station, colony, or space manufacturing site for processing. There's no reason an oil company couldn't build and own those plants, too, and open them up to a lucrative tourist trade on the side, by the way.

When gravity-control arrives, companies with vast resources, such as Big Oil, will be better positioned than any other to diversify into space-based mining and other industries. This is why Big Oil needs to jump on the opportunity *now*, or else wind up making expensive leasing contracts with companies that *are* first to build gravity-control empires and space-based mining stations (like the oil platforms of today). If Big Oil were to make a small initial investment today, their "sci-fi side business" would quickly overtake their main profitmaking enterprises, and they would secure the patents that will be worth trillions tomorrow. Early investment is the way to improve the company's profit picture during the transition. To *wait* is to *lose* this historic opportunity *forever*.

The moral of the story of asteroid 2011 UW158 is clear: *Space is overflowing with material resources and opportunities for private enterprise*. Asteroid 2011 UW158 is but one nugget in a sea of gold. And the game-changing technology described in this book throws open the doors to the new Gold Rush, *Platinum* Rush, as the case may be.

The cost of a single offshore drilling rig is $200 million. The cost of redoing the 1994 experiment is a thousandth of that—roughly the price of a three-bedroom, two-bath middle-class house. A cheap investment today that reaps *trillions* of dollars tomorrow? What is there to lose? The alternative is to wait and be blindsided, like the record companies who were *shocked* when digital file-sharing “snuck up on them” in plain sight.

This chapter was written to show the petrochemical industry how to avoid the pain and go directly to the profit by the shortest possible route. As the record industry learned, failure to adapt is more than a pointless exercise in futility, it’s a colossal waste of money. The future of Big Oil is out there, and if you squint your eyes a bit, you can see it—in the form of a flying saucer.

Chapter 9

THE AUTOMOTIVE INDUSTRY

THE ADVENT OF GRAVITY CONTROL means the realization of a long-held dream for the auto industry: the merger of flight technology with private transportation. The product of this merger will be an explosion in sales beyond the wildest dreams of the world's largest automakers today.

The industry is already diluting the gasoline-driven market with electric cars and hybrids. The introduction of an all-electric, gravity-control vehicle merely extends this trend into the vertical dimension. Much as it was with the "horseless carriage," lack of familiarity with gravity control will rapidly fade as friends, families, and relations of early adopters begin to enjoy the spectacular and exhilarating sense of freedom afforded by the new line of vehicles.

Past attempts to build a light plane that can fit in a garage and function as a commuter vehicle have failed to measure up to the needs of an average family with a three-bedroom, two-bath house, 2.5 children and a thirty-year mortgage. Barriers include:

- Price
- Pilot skill (and eyesight)
- Weather vulnerability
- Infrastructure limitations; i.e., the awkward wingspan of a light plane, the need for landing fields, hangars, air traffic towers, and ground crews (*cont. next page)*
- Limited load capacity
- Safety considerations

Gravity control solves all of these problems in a big way:

Price: Cost-savings are inherent in saucer design. They have few moving parts and do not require powerful jets or propellers. Neither do they consume much fuel. The principal material used in their construction is aluminum, one of the most abundant metals in the Earth's crust. As long as the vehicle operates below 14,000 feet, a pressurized cabin is unnecessary. Expenses will concentrate in computer and sensor systems, the power plant, and the gravity-control generator. Mass production will bring all of these within range for a middle-class income, but ownership is not a requirement. Robotic, government-owned private saucers can ferry people to and from work on a pay-per-flight basis. Mass-transit systems are also possible.

Pilot skill: If average people were required to learn how to pilot a high-performance gravity-control vehicle, the barriers would be insurmountable. Fortunately, there will be no such requirement. According to *Business Insider*, companies such as Mercedes, BMW, and Tesla have already released, or are soon to release, cars with some ability to drive themselves. High-tech companies, such as Google, are also getting into the act with completely driverless vehicles. *Business Insider Intelligence* predicts that ten million self-driving cars will be on the road by 2020. The point is twofold: first, customers will soon be accustomed to riding in self-piloting vehicles; second, the AI software already being developed for self-driving vehicles will be adaptable to gravity-control vehicles. The pilot of a gravity-control vehicle will punch in a destination, sit back, and let the saucer take over. (*See Chapter 14, p. 75, for a detailed scenario.)* Human error will be sharply reduced with autopilot saucers.

Weather dependency: Flying in a light plane can be bumpy, even in calm weather. In rough weather, the gyrations become violent and frightening. Bad weather or poor visibility can also preclude flying altogether. Gravity-control aircraft are non-aerodynamic, so weather conditions are almost irrelevant. Stability can be achieved several ways, including computerized adjustments according to homing beacons, or the Earth's magnetic field. Since gravity control also reduces inertia, passengers will never experience a bumpy flight, no matter what gyrations the craft undergoes.

Infrastructure limitations: Light planes require runways for takeoffs and landings and hangars for storage, which virtually excludes them as commuter vehicles for someone with an average income. Gravity-control vehicles will be capable of vertical takeoffs and landings in any weather, at any speed, from virtually any flat surface (a backyard lawn, for example), which means they are fully adaptable to urban and suburban environments and do not require airfields.

Since airfields will not be needed, there will be no need for secondary ground transportation from the airfield to the actual destination and from the destination back to the airfield. Personal saucers will be door-to-door vehicles, which, like automobiles, can be stored in parking garages between flights or simply parked in open lots surrounding destination buildings. But saucers differ from automobiles in two important respects: they do not require roads, and they can easily fly five times as fast as an automobile between destinations, traveling *in a straight line*.

Load capacity: Like automobiles, private saucers can be engineered for two, three, four, six, or more passengers. As the number of passengers increases, so does cabin size and disc or sphere diameter. Optimal configurations must be determined by research and development.

Safety: Planes, trains, and automobiles have safety risks associated with them, including collisions, high-speed machinery, engine heat, explosive fuel and cargo, and human error. Saucers are highly maneuverable, so collisions are less of a concern. They have no high-speed machinery associated with them (other than the saucer in flight). Problems may arise from heat generated by the power plant and the effects of dynamic nuclear orientation on biological organisms, but the problems are soluble. The saucer shape is aerodynamically suited to high-speed flying within our atmosphere. The gravity-control process will probably create a layer of ionized gases around the hull of the craft, which will allow it to travel at supersonic speeds without significant friction with the atmosphere or sonic booms.

Microwave radiation presents safety problems. The plan is to contain the generator in a shell at the center of the saucer below the cabin and conduct pulsed dynamic nuclear orientation from the generator to the hull of the craft by aluminum spokes with colloidal magnesium or iron inclusions to assist penetration of the effect. Passengers can be shielded from exposure by cabin walls, helmets, and flight suits made with aluminum fiber. There may also be ways to induce the gravity-control effect *without* the use of microwaves. One such method involves an aluminum flywheel. My father was experimenting with this at the time of his death.

DESIGN FEATURES

In order to reduce costs while enhancing user experience, terrestrial gravity-control vehicles will be less sophisticated than spaceworthy models. A class of vehicles with reduced flight characteristics will emerge to appeal to users who are comfortable with automobiles. These would resemble the "land speeders" that appear in the *Star Wars* films and would allow limited use of manual controls.

A present-day hovercraft—Paul Moller's M200G Volantor—looks much like the envisioned saucer. The M200G is shaped like a saucer, with eight computer-controlled fans around the perimeter, a domed cockpit made of clear plastic in the center, and a stabilizer fin in the rear. Moller's fans are powered by gasoline or diesel fuel. At present, the M200G has a load capacity of 350 pounds and a computer-regulated operating altitude of ten feet in order to comply with FAA regulations (if its altitude were to exceed ten feet, it would be regulated like an airplane). The M200G can fly over any kind of terrain at 50 mph.

A gravity-control saucer would have *electric* fans a fraction of the size of Moller's current fans, as minimal thrust goes a long way in a vehicle with an effective weight of a few ounces at most. Compressed gas jets have also been suggested. The stabilizer fin in the back would be reduced or eliminated in order to minimize drag; it's only purpose in a small saucer would be to keep the vehicle oriented "forward" in flight. Some lift comes from the fans or jets. The rest comes from buoyancy, as the craft becomes lighter than air when the gravity-control effect reaches maximum.

The top speed of propeller-driven aircraft *without* gravity control is 670 mph. We can assume that *with* gravity control, it would be much faster. Air resistance is a limiting factor, but as noted above, it is anticipated that the saucer will be surrounded with a "skin" of ionized gases that will enable it to slip more easily through the atmosphere.

Other kinds of propulsion, including turbojets, ramjets, and scramjets, will enable supersonic or hypersonic speeds. Turbojets are attractive because they can be fueled with alcohol. Bear in mind that these jets would be tightly engineered, but *miniature* by the standards of today, on the order of model airplane jets. The ultimate form of propulsion would be an electromagnetic drive that utilized the Earth's magnetic field. The energy in the field is 0.25 to 0.65 gauss at the Earth's surface, which is minuscule, but more than enough to move a "weightless" compass needle. A vehicle under the influence of gravity control will weigh *less* than a compass needle, and powerful electromagnets onboard can be directed at any angle to the Earth's magnetic field, enabling astounding mobility and acceleration without burning any fuel or making any sound. A sophisticated drive system such as this would be ideal for space travel. Once the vehicle has exited earth's gravitational field, it can use the gravitational fields of celestial objects to maneuver, simply by increasing the gravitational force on one side of the craft and decreasing it on the other. While solar power would be helpful, such vehicles will probably require some kind of onboard reactor (*see pp. 32 – 33, 240, 249)*. For terrestrial vehicles, turbojets and propellers are a far more economical and attractive alternative. A slotted rim on the saucer spinning at high speed has also been proposed.

Most of the vehicle's energy would be invested in maintaining the gravity-control effect. A capacitor in the belly of the craft is suggested for cycling the current to the microwave generator. The weight of the capacitor, which will account for most of the rest-weight of the vehicle, is almost irrelevant, because it is neutralized in the preflight warmup, along with the weight of the occupants. If such a system can store enough power to maintain the gravity control effect for three hours, the range of the vehicle would be most of the North American continent. There would be no need to "recharge." The vehicle would simply touch down at a "fueling station" and exchange a dead battery for a live one. The fueling station would attach the dead battery to a charger and exchange it out for the next customer. Alternatively, air scoops could drive turbines attached to a charger.

A spaceworthy vehicle will cost more than a terrestrial craft. The added cost stems from the need for added shielding, structural strength, advanced instrumentation for navigation, communication, and viewing, added power to feed an electromagnetic or gravitational drive, and backup propulsion systems for maneuvering near planets without an electromagnetic field.

In order to preserve the integrity of the gravity-control effect, the dome of a terrestrial craft should be covered with a semi-transparent aluminum film. Advances in material science should yield increasingly elegant solutions to this problem, such as transparent metal.[4] The saucer will be equipped with a parachute in case of emergency. Drivers will need simulation training to prepare for the eventuality of a bailout, but a breakdown while airborne is less likely to occur in a gravity-control vehicle than a conventional aircraft. Saucers experiencing heating problems can simply touch down almost anywhere: no landing strip required. Saucers will get an automatic safety check after each landing. Those who could not adjust to the idea of a high-altitude bailout could use vehicles that maintain a ceiling of one to ten feet, like the Moller M200G mentioned above.

CONCLUSION

Gravity control means the long-sought merger between private transportation and air travel. This will touch off a chain reaction of economic growth that is not only unprecedented, but *unfathomable* to us now. A similar situation existed in the mid-1700s at the dawn of the Industrial Age, in the late 1800s, at the beginning of the automotive age, in 1903, when the Wright Brothers flew at Kitty Hawk, at the end of the 1940s, when jet aircraft superseded propeller-driven flight, and in 1970, at the beginning of the computer age. We might even include the year 2007, when Apple put the first smartphone on the market. No-one alive at the dawn of these eras sensed all that was implied by these technological innovations, and in our opinion, the changes in store for society in general and the automotive industry in particular because of gravity control far outstrip *any* of the above. We would go so far as to say that the world is about to undergo an economic “leap to hyperspace.”[5]

The revamping of transportation will include a thousand-and-one new vehicle designs, ranging from those with performance characteristics not unlike today’s ground-based transportation up to and including private space vehicles. New manufacturing sites will be needed to produce these vehicles, which presents an opportunity to reinvigorate Detroit and other depressed manufacturing areas. Eventually much of the manufacturing will move off-planet, which has a host of implications worthy of a book in itself. All sectors of the industry will be affected, including trains, trucking, public and private transportation, and transcontinental shipping. The new field of space commerce will require countless new vehicle configurations, all of which would be science-fiction by today’s standards.

Ancillary industries will receive a shot of adrenaline from the economic activity unleashed by gravity-control technology. All new vehicles will require new infrastructure, new kinds of support and repair, and new onboard electronics, including sophisticated new computer systems for navigation and flight control. As people abandon four wheels for “no wheels,” the materials in existing automobiles will be recycled into saucer hulls and other uses.

Rather than go on listing the effects of gravity control on the automotive industry and other spheres of economic activity, I have created a scenario of the world in 2057 A.D. in *Chapter 14*, *The Shape of Things to Come (see p. 75)*.

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[4] *Aluminum oxynitride is a promising material, since it is strong, 80% transparent, and aluminum is a principal component.*

[5] *See* Star Wars – Episode IV, *if the terminology is unfamiliar*.

Chapter 10

STAKEHOLDERS

ASSUMING THE ATTEMPT to replicate the 1994 experiment meets with success, the companies listed below are in line to benefit. Military contracts will figure large in the future of gravity control, but here we are primarily concerned with private sector growth.

Currently, gravity control is surrounded with a quasi-mythical aura, which disguises its forthcoming role as an integral part of everyday life. The purpose of this list is to dramatize the public role of the technology. The list is far from complete, but it suggests avenues for mainstreaming.

One important point emerged while composing the list: Gravity control will break down boundaries and categories between companies. For example, the boundary between spacecraft and aircraft will blur, as will the boundaries between automobile manufacturers and aviation manufacturers, self-driving earthbound cars and self-piloting airborne saucers, spectroscopy and propulsion, software and avionics, helicopter makers and aircraft or automobile makers, drone companies and private aircraft or space exploration companies. Every company on this list should look at the potential for creative mergers in the near future.

Companies that invest in R&D now will reap greater rewards in the future, while companies that prefer to wait for someone else to "prove it out" will have to get in line to pay licensing fees.[6] Companies in categories (2) through (8) below should consider mergers.

1) MICROWAVE, RADAR, AND SPECTROSCOPY COMPANIES

> Delphi, EEC, JEOL, Microwave Dynamics, Microwave Solutions Inc., Zeiss, and other companies too numerous to mention.

2) ELECTRIC VEHICLE MANUFACTURERS

> BMW, Chevrolet, Daimler (Mercedes-Benz), Fiat, Ford, Kia, Nissan, Tesla, Toyota, Volkswagen

3) AIRCARS

Aero-X, Hoverbike, Moller Skycar, Terrafugia TF-X, X-Hawk

4) LIGHT AND ULTRALIGHT PLANE MANUFACTURERS

Aero Adventure, Aeropro CZ, Airdrome Aeroplanes, Arion Aircraft, Carlson Aircraft, Cessna, CGS Aviation, Dynali Helicopter, Earth Star Aircraft Inc., Fisher Flying Products, FK-Lightplanes, Flightstar, Hipps Superbirds, ICON Aircraft, IndUS Aviation Complex, Jabiru USA Sport Aircraft, Kappa Aircraft, Lockwood Aviation, Loehle Aircraft, New Kolb Aircraft Co, Nexaer, Oregon Aircraft Design, Piper Aircraft, Preceptor Aircraft Corp., Quad City Ultralight Aircraft Corp., Quicksilver Manufacturing, Remos Aircraft GmbH, Sonex Aircraft, Tecnam Aircraft

5) CORPORATE JET MANUFACTURERS

Boeing Business Jets, Bombardier Business Jets, Citation, Cirrus Aircraft, Daher-Socata, Diamond Aircraft, Eclipse Aerospace, Embraer, Extra Aircraft, Gulfstream Aerospace, Hawker Beechcraft, Honda Aircraft, Learjet, Piaggio Aero Industries, Pilatus Business Aircraft, Piper Aircraft, Quest Aircraft, Syberjet Aircraft

6) MAJOR AIRCRAFT COMPANIES

Airbus, Boeing, Bombardier Aerospace, Cessna Aircraft, Dassault Falcon, Lockheed Martin, Piaggio Aero Industries

7) HELICOPTER COMPANIES

Agusta Westland, Bell Helicopter, Enstrom Helicopter, Eurocopter, MD Helicopters, Robinson Helicopter, Sikorsky Aircraft

8) DRONE MANUFACTURERS

Aerovironment, Amazon.com, Boeing, Dajiang Innovation, Denel Dynamics, Lockheed Martin, Parrot EPA, Facebook, Google, Matternet, Skycatch

9) COMPUTER COMPANIES, SOFTWARE DEVELOPERS

Airware, Apple, Microsoft (for development of local, national, and global interactive flight control networks and security), Avionics software developers such as ENSCO, Aurora, Cobham (for vehicle control and safety)

10) CIVILIAN SPACE EXPLORATION

The line between the following companies and conventional aircraft companies is about to blur.

Bigelow Aerospace, Blue Origin, Ford Aerospace, Orbital Sciences, Planetary Resources, Scaled Composites, Space Adventures, SpaceDev, SpaceX, Stratolaunch Systems, Virgin Galactic

11) MANUFACTURING AND CONSTRUCTION

Gravity control allows duplication of space manufacturing environments in terrestrial laboratories. Uses include crystal growth, processing of immiscible alloys, formation of spheres from molten metal, and medical/bioengineering applications.

Pulsed nuclear orientation can be conducted to robotic equipment on factory floors via aluminum wires, reducing inertia in high-speed equipment. This will allow robot armatures to run at extremely high speeds with low energy consumption and without overbanking or tearing the machinery apart.

With gravity control, it will become possible for small crews to position or move large masses without the use of cranes.

ABB Ltd., Adept Technology, Apex Automation and Robotics, Aurotek, Axium, Denso Wave, Ellison Technologies, Kawasaki Robotics, Kuka AG, Fanuc, Nachi Fujikoshi, Pari Robotics, Reis Robotics, Rockwell Automation, Schunk GmbH, Staubli International, TM (Toshiba Machine) Robotics, Yamaha Robotics, Yaskawa Electric

12) PETROCHEMICAL COMPANIES

See *Chapter 8*, *Big Oil*, for a discussion of the role gravity control will play in the future of petrochemical companies—*not* as a competitor, but as a new source of revenue and an eventual escape (without loss of profit) from industry-threatening problems, such as peak oil, decreasing ROI, increasing regulations and liability expenses for environmental destruction.

Major oil companies include Abu Dhabi National Oil, BP, Chevron, ConocoPhillips, Eni (Italian multinational), ExxonMobil, Gazprom (Russia), Iraqi Oil Ministry, Koch Industries, Kuwait Petroleum, Lukoil (Russia), National Iranian Oil Co., Nigerian National Petroleum, Pemex (Mexico), Petrobras (Brazil), PetroChina, Petroleos de Venezuela, Petronas (Malaysia), Qatar Petroleum, Rosneft (Russia), Royal Dutch Shell, Saudi Aramco, Sinopec (China), Sonatrach (Algeria), Statoil (Norway), and Total (France).

13) TRAVEL AND ENTERTAINMENT

Eventually gravity control will be incorporated into theme-park rides and exhibits.

Magicians who adopt now, before gravity control is an everyday fact of life, will be able to perform astounding stunts while changing the course of history by helping to mainstream the world-changing technology. (Email info@klafraknar.com and include verifiable contact information.)

The travel industry will undergo the greatest transformation of all. Transportation costs will drop and the globe will shrink as privately owned saucers routinely begin to fly at Mach 2 or more. Since takeoffs and landings will be vertical, airports will no longer require runways and taxiing areas. Landings can take place on remote islands and mountaintops without airstrips. More important, space itself will become a destination, with sightseeing tours at first, then sojourns on space stations or lunar and Martian colonies later.

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[6] *Company representatives email* info@klafraknar.com. *Include verifiable contact information.*

Chapter 11

GEOPOLITICS

THIS CHAPTER MAY WELL BE MOOT, since the science in this book has yet to be proven conclusively and a rerun of the 1994 experiment may show that the results were in error. However, if we are willing to entertain the notion that gravity control *might* be real, the question arises as to whether it should be released now, when international tensions are high and the established order is ailing.

The answer is “Yes, now more than ever.” But the question implies that this book contains some new revelation when the opposite is true. A complete starter kit for the new technology was presented in 1981. Every effort was made to initiate a research program between 1981 and 2015, and the powers that be, including the defense industry, never showed the slightest interest. The science has remained on the public record for thirty-five years. What makes this book new is the intensifying threat of climate change. And that’s the point: If your house is on fire, you *want* someone to haul you out of bed and help you put it out, preferably with a firehose, not a water bucket.

Had gravity control been mainstreamed in 1981, today climate change might be a thing of the past, and the economic ills threatening the established order might never have arisen. Thanks to the delay, it may already be too late to reverse the damage. Therefore the time for waiting is long since *over*—the technology *must* be tested, and if it works, it must be mainstreamed *now*. Nothing offers a more effective way to influence climate change, while at the same time benefiting the global economy.

It’s hard to think of anything that would trump the survival-of-the-species argument, but let’s pursue the question a little further:

When has the world *ever* been free from turmoil? And when has turmoil or the threat of it ever stopped a new technology from making its debut? The A-bomb debuted *during* World War II, not before. If it were necessary for world peace to break out before releasing a new technology, we’d still be running around in animal skins, and when the sun set, we would retire to our caves to shiver in the dark while devouring raw meat, because after all, *fire* was one of the first technological innovations that might be used as a weapon.

Progress is always double-edged. In the majority of cases, we find that new technologies are absorbed by society, changing life for the better. And unlike fire, spears, or gunpowder, there is *nothing* inherently destructive about gravity control. Unlike nuclear fission, which can be used to make a bomb that can destroy a city or even all life on earth (which it may already have done, thanks to Fukushima), gravity control can't burn, can't explode, can't destroy anything at all. It *can* be used to explore the cosmos, build space-based factories, mine the asteroids, colonize the Moon and Mars, and bring fresh water back from the moons of Saturn and Jupiter. It can also give us the power to defend our planet from rogue asteroids or comets. *No more Chicxulubs!*[7] It will enable us to get rid of toxic waste once and for all and give the Earth a chance to heal. It will revitalize the economy and initiate a new Industrial Revolution. And it will do more to reverse global climate change than ten million windmills, by giving the major polluters something more profitable to do with their time and money. For these and other reasons, gravity control is nothing to fear: it is a force for *peace* and the survival of the species.

If it works, of course.

As noted above, gravity control technology was released at the 17th Joint Propulsion Conference in Colorado Springs in 1981. From there it promptly went into a state of suspended animation. Therefore the question isn't really whether it should be released now, but whether or not somebody has done something about it in the intervening time. Scientists from every country in the world have had unhindered access to the 1981 paper and several other related publications for thirty-five years. Even the success of the experiments has been alluded to in at least four publications, including a peer-reviewed paper. So there is no odor of Edward Snowden about this book. More like Paul Revere.

Instead of worrying about the effect of *How to Build a Flying Saucer*, we should be concerned with whether or not the 1981 paper has already been researched by foreign military powers, a segment of society not known for broadcasting their secrets. If this is the case, *and* the technology works, it will create exactly the imbalance of power so dreaded on all sides. As occurred with Sputnik in the 1950s, the U.S.—which has been blithely pinching pennies on *pure* research for decades—will wake up to find itself scrabbling to catch up to a technology one of our nation's *own scientists* tried to *give away* in 1981 and several times thereafter.

It is my hope that the unpleasant prospect of the People's Republic, the Russian Federation, or any number of small universities in Germany, Eastern Europe, Scandinavia, or the Middle East laying their hands on gravity control—whether in the past, present, or future—will prompt the institutions that ignored my dad's proposals between 1960 through 2012 to reconsider.

Again, it must be emphasized that the map to gravity control has been published five times over the last thirty-five years prior to this book, with easy access for all. My concern is that the U.S. may have dropped the ball, allowing some other country to get a lead in research and development.

If it's true, of course.

Now let's take a deep breath and consider the whole thing from another angle.

You know that deep breath you just took? It's got 400 parts per million of CO_2 in it, and rising. The safety ceiling for atmospheric CO_2 is 350 parts per million. Earth's CO_2 count has been higher than that *since 1988* and it is rising *at an accelerating rate*. "Safety" is a concern because CO_2 is a greenhouse gas, and manmade CO_2 is the number-one cause of global warming.

Did I mention methane? Not the often-mocked methane from cow farts, but the *trillions of tons* of methane trapped on the ocean floor and in the Arctic tundra. It's beginning to bubble up now, thanks to the warming ocean currents brought on by the buildup of greenhouse gases. Methane is ten times more effective than CO_2 at trapping heat in the atmosphere. While I was drafting and revising *How to Build a Flying Saucer*, more than 91,000 metric tons of methane leaked from one storage facility in southern California, the equivalent of burning 862 million gallons of gasoline. But this little burp is nothing compared to what is about to belch from the ocean floor in the Arctic.

The global warming cycle is self-augmenting, like feedback in a guitar amplifier. The worst that an amplifier with feedback can do is blow out your eardrums. But CO_2 and methane can extinguish all life on Earth—not just human life, but *all* life.

Does that sound like a major geopolitical concern? Does it sound like something that might provoke wars? Upset the financial markets? Ruin Christmas?

Senator James Inhofe (R – Oklahoma), author of *The Greatest Hoax: How the Global Warming Conspiracy Threatens Your Future*, might not think so, but the Pentagon does. Google "Pentagon global climate change report" and click on the link to the July 29, 2015, Department of Defense report (612710).

In 1981, the year of the Colorado Springs paper, most people in the U.S. thought of global climate change as a threat to beachfront real estate values in Florida. That was all. We did not understand the self-augmenting interconnectivity of climate factors. When my father began writing research proposals a few months after delivering the Colorado Springs paper, he put in a few sentences about how the technology would alleviate global warming, but he removed them from the final draft. "Nobody believes it," he told me. "They'll think that I'm an alarmist." He was having enough trouble selling "antigravity" without mentioning "global warming" in the same breath.

I, on the other hand, freely admit to being an alarmist. And I'm in good company. The website skepticalscience.com cites a study that shows a 97% consensus on human-caused global warming among publishing climate scientists, and the higher the level of expertise, the higher the consensus. [8]

If gravity-control technology proves to be real, then the failure to bring it online in 1981 has to rank as one of the most colossal bureaucratic and scientific blunders in human history, though no one may be around to care about it in a couple of hundred years. It is much the same as if the Einstein-Szilárd letter of 1939 (concerning the possibility of the Nazis building an atomic bomb) had been ignored by FDR and his advisors, many of whom called it “science-fiction.” The result would have been the Axis getting the atomic bomb first, followed by the annihilation of London and Moscow, the Nazis winning World War II, and the unimpeded progress of “the Final Solution,” which probably would have been extended to all “non-Aryans.” As bad as this sounds, the effect of failing to mainstream gravity control could well be *worse*, because it might result in the extinction of all life on this planet.

If the technology had been mainstreamed in 1981, the environmental crisis we are facing today probably would never have arisen at all. Instead, we would be thirty-five years along the course of an alternative history characterized by an unprecedented economic boom, city-sized orbital space stations, space colonies on Mars and the Moon, and a flying saucer—or something like it—in every garage. Meanwhile our cities would be transforming into something out of *Star Wars* or *Star Trek*.

In the 1960 meeting described in *Milestone III (p. 103)*, an Air Force Colonel at Ames Research Laboratory told my father that an antigravity propulsion project would be classified higher than the Manhattan Project.[9] That made sense by Cold War standards. Now the pendulum has swung to the opposite extreme: In today’s world, it is vital to *spread* gravity-control technology throughout all sectors of human society as rapidly as possible because it is the *only* way the technology can have a significant impact on climate change. The rewards far outweigh the risks. For those still inclined to worry about strategic imbalance, there are several reasons for reassurance.

First, as noted above, there is nothing inherently destructive about gravity control.

Second, it will be difficult to mount rockets, guns or bombs on a flying saucer. Maintaining nuclear orientation in spatial extent on a gunship or a bomber would require a high-output power source, such as an onboard nuclear reactor. The limited power reserves possible with present technology dictate seamless hull integrity. A gun turret or port or open bomb bay would cause the craft to plummet out of the sky. Saucers using conventional power sources *must* touch down before a hatch opens. Using a drone saucer to deliver a bomb is a possibility, but saucers—especially those with weaker power plants—can be brought down with broadly targeted electronic countermeasures, such as a radar beam strong enough to disrupt the propulsion system, which means that a rogue craft using gravity control can be dropped from the sky at the speed of light *without* a direct hit by a missile.

According to apocryphal stories, alien ships were vulnerable to radar beams in the 1940s, but they have toughened up since then. It will be a *long* time before we have anything as sophisticated as an alien saucer here on Earth. The onboard power supply of a typical, thirty-foot diameter UFO is upwards of 1.5 megawatts. Nothing even close to that is possible with current technology. Their ships are like the cigarette boats of the sky. Ours will be like rowboats for a long time to come.

Third, past is prologue: The evolution of gravity control will be much like the evolution of conventional aircraft and rocketry since Kitty Hawk. Airplanes have played an ever-increasing role in military operations, but on balance we accept this as the price we pay for the benefits they confer. The progress of saucer technology will be similar: Commercial benefits will accrue immediately, and design advances on one side will be met with advances on the other. In the end, progress will balance out just as it has with fixed-wing aircraft: the most sophisticated aircraft and spacecraft will wind up in the possession of the military, while smaller, lighter, slower versions will wind up in the hands of private companies and individuals. The power edge will always go to the military because societies always confer unlimited resources on national defense.

PROSPECTS FOR PEACE

The advent of gravity control will bring about profound changes in society. One of these might well be a decrease in geopolitical tension. While mankind seems to have an irrepressible urge to use every new technology as a weapon, there are features of saucer technology that may push humanity in the opposite direction, that is, toward peaceful cooperation, rather than violent competition.

First, the more the technology proliferates, the more human beings will see the Earth from space. The psychological effects of this experience are profound. In 1987, author Frank White coined the term "overview effect" to describe it in his book, *The Overview Effect: Space Exploration and Human Evolution* (a second edition was published by the AIAA in 1998). According to White, seeing the Earth from space left an indelible impression on all astronauts. From space, the conflicts that plague humanity seemed insignificant. In 1998, after returning from his final trip into space at age *77*, astronaut John Glenn said, "To look out at this kind of creation and not believe in God is to me impossible... It just strengthens my faith." All seem to agree that it is impossible to contain the experience in mere words.

Within five years after gravity control goes mainstream, tens of thousands, perhaps *hundreds* of thousands of people will have seen the Earth from space and experienced the overview effect. Within *ten* years, the number will be in the millions. Eventually hardly a living soul will fail to experience "the overview" at least once in a lifetime, while many will spend extended periods in space, living and working in space stations or colonies on the Moon and Mars. This will bring about lasting changes in human consciousness, and probably for the better. It is likely that the second or third generation born after the debut of saucer technology will look upon the conflicts of the twentieth and early twenty-first century as strange, barbaric, primitive, irrational, and incomprehensible from the new, cosmic perspective.

Second, much of the world's conflict over the last five thousand years has been predicated on competition over limited resources. Two or more groups want the same land, the same water, the same food supply or the same trade routes, and they go to war to wrest control from their enemies or to maintain control themselves. The assumption of scarcity drives the choice of leaders as well as policy. Remove scarcity and the whole structure will morph into something new. Saucer technology will catalyze this process. Resources in space are virtually limitless, and soon those resources will be coming back to Earth to energize commerce and industry.

But one need not go into space to see how saucer technology will revolutionize resource allocation here on Earth. Among other things, channels of distribution will flow more quickly, building in remote areas (including space) will ease population pressure, and ease of construction will make living more comfortable for more people. In addition, employment will be at an all-time high, and traveling from one job-rich area to another will be more feasible for more people than ever.

CONCLUSIONS

- Global climate change, not gravity control technology, is the ultimate threat to geopolitical stability. Gravity control can help to reverse climate trends, but this will only occur if the technology saturates industrial societies as quickly as possible. The corporations now causing global climate change will be early adopters—not because they are altruistic, but because gravity control leads to higher profits while solving their most intractable problems (*see p. 39*).

- Concerns over national security are justified, but only if gravity-control technology is developed in secret by one country to the detriment of others. The existence of the technology has been an open secret for thirty-five years; this book merely promotes symmetrical development.

- The evolution of saucer technology will parallel the evolution of aviation and aerospace technology, leading in an upward spiral toward strategic balance and cooperative ventures in space and on the ground.

- Widespread dissemination of the technology will have positive effects on society and may alleviate conflict, rather than exacerbate it. A short list of positive effects includes sustained and expanding economic growth, improvements in transportation and distribution, new frontiers for colonization and industry in space, proliferation of the overview effect, replacement of the culture of scarcity with the culture of abundance, alleviation of climate change, and the cleanup of toxic waste sites.

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[7] *The asteroid that ended the age of the dinosaurs struck near Chicxulub on the Yucatan peninsula with the kinetic energy of 300 million nuclear bombs. Gravity-control vehicles would allow rapid-response countermeasures to an incoming asteroid or missile. If the threat could not be neutralized, entire cities could be evacuated within minutes.*

[8] A PDF of the study is available at http://iopscience.iop.Org/article/10.1088/1748-9326/11/4/048002.

[9] *See Appendix E, p. 355*

PART III

Scenarios

I discovered, to my amazement, that all through history there had been resistance ... and bitter, exaggerated, last-ditch resistance... to every significant technological change that had taken place on Earth.

— Isaac Asimov
Newark College of Engineering lecture, 1974

Chapter 12

THE ONE-PERCENT SOLUTION

THE FIRST STEP toward the future predicted in *Chapter 14*, *The Shape of Things to Come*—and presumably away from a looming environmental catastrophe—would be a successful demonstration of the gravity-control effect. Once that happens, a chain reaction will occur, and the floodgates of funding will open. Since the cost of restaging the 1994 experiment ranges from almost nothing for an existing laboratory to under $1 million for a corporation or individual starting from scratch, the reader may feel encouraged to believe that something is sure to be done and that they will soon read about it on the Web (*Chapter 13* covers this topic).

Perhaps it is against my own interests to say so, but based on a lifetime of experience, I believe it would be naive to be hopeful. Looking only at the technology and what it offers, *yes*, a lay reader might be convinced that “someone is bound to do something about it.” The rewards are so high and the risk is so low that one might call it a “no-brainer.”

But who? *Who* will do something about it? When one considers the groups and individuals who have the power to take action, the outlook darkens. If this book were to sell 100,000 copies, an absurdly optimistic figure, the buzz might be enough to rattle a few cages higher up the food chain, but even then I believe the probability of something being done are really somewhere around one percent.

A rigorous mathematical analysis follows.

UNIVERSITIES

Stephen Hawking has weighed in on the necessity of establishing a beachhead in space, and doing so with all haste. In a November 2016 speech at the Oxford University Union, U.K., Hawking said that humanity has less than a thousand years before it succumbs to mass extinction, and in the face of this inevitability, the only recourse is to find another planet to inhabit.

Some would say his timeline is too generous, and some folks think this planet is worth saving, so why not try? But if what Hawking says is true, a breakthrough technology that granted quick and easy access to space would be a godsend. And, by a strange coincidence, just such a technology is described in this book. Yet there is no group *less* likely to answer the call to test it than academic physicists, such as Stephen Hawking.

The deeply disappointing, often unbelievable, sometimes comical, but *never* scientific, fifty-year history of the UFT with academia has been described throughout the book, and the reportage only scratches the surface. No need to recap the highlights here, so let me focus on the present day.

Most of my efforts after December 2012 were directed at engaging the interest of academia in repeating the 1994 experiment. With an easy Nobel on offer, as well as the exciting prospect of opening up new frontiers in research and space exploration, how could they refuse? But one after another, refuse they did. The Internet was scoured for likely institutions and contacts, numerous emails were sent, the network of academic friends and acquaintances was explored. Seven months were spent in writing just one detailed proposal. None of this was enough even to initiate an informal discussion. At the end of two years, the sum total response came to a couple of guarded, impersonal, and tersely worded email rejections. Certainly, if it were me *alone* making such a proposal, such a response would have been warranted. But it was not appropriate in the case of my father, as abundantly documented throughout the book. Yet there it was—the same wall that had been in place since 1960, only worse.

That is why I believe the assessment below is rather realistic.

• Probability that academic physicists will answer the call: 0.00001%

PRIVATE INDUSTRY, RESEARCH FOUNDATIONS, BILLIONAIRES

This rogues gallery is the home of the phrase, “Prove it out and get back to us.” Within companies or foundations, mid-level decision makers are extremely risk-averse. One can understand why: careers are at stake. The billionaire set (synonymous these days with “visionaries”) seems prone to assess the value of a high-tech venture by its kinship to existing technologies with a proven upside. They also seem highly impatient with anything more complex than a log line. All three are prone to relying on “expert opinion” *(see Chapter 27, p. 199)*.

Since our proposed technology has no precedent, it comes with a learning curve attached, and since the word “antigravity” ensures that middle management will bar the door, no learning has ever taken place.

A working model would settle all arguments, but the apparatus described in *Part VIII was* dismantled in 1994 *(see p. 119)*, leaving only the report on pages 283 – 330 behind. The charts are interesting, but not convincing enough to tip the scales *[sic]* in favor of belief, as I learned between 2013 and 2015.

• Probability of success in the private sector: 0.01%

DEFENSE INDUSTRY

Even if the defense industry were to initiate a project based on this book and the project was a success, the results would never be shared with the public. Defense or war is their concern, so everything is either a shield or sword to them. Thus no environmental or economic benefits would accrue to humanity. The whole subject is therefore moot.

Let us assess the probabilities anyway, as a kind of thought experiment. As described in *Milestone III (p. 103)*, the Air Force punted my father's proposal for a research project in 1960. His 1981 paper certainly would have come under scrutiny, given the venue in which it debuted, his security clearances, and the work he had done for the defense establishment in the past. Yet neither the DoD nor any of the other alphabet agencies reacted to it. They had another chance in the mid-to-late 1980s, when he submitted a proposal to the DoE. They turned him down. Boeing, where he was employed in 1981, wanted their name removed from the paper. No other aerospace contractor expressed an interest. Perhaps the word "anti-gravity" in the title of the 1981 paper was to blame. Hard to say.

Following Newton's First Law of Motion (the law of inertia), we are confident that things will remain the same in the future. Bureaucrats react to threats; they seldom, if ever, launch initiatives. Their power derives from the word "No." The word "Yes" is fraught with risk for them.

Conclusion: It is doubtful that the defense establishment will do anything about this book. Instead, they will, as they have in the past, go on about their business until a Sputnik event occurs.

• Probability that the DoD will redo the 1994 experiment: 0.0001%

THE "UFO COMMUNITY"

Science is a body of facts established by publicly repeatable observations. Most UFO investigations produce neither. Instead, rumor and speculation flourish in these circles. While I appreciate the efforts of dedicated journalists such as Linda Moulton Howe and courageous individuals such as Dr. Steven Greer, I can't imagine any concerted effort toward remounting the 1994 experiment arising within the world of UFO researchers. For one thing, funds are notoriously scarce in this sector.

In July 2004, my father published an article in the *MUFON Journal that* offered crop circle researchers a way to duplicate the crop circle phenomenon on a small scale. The same demonstration would have proven the reality of UFOs and turned the world of science upside down. The result: Not one inquiry. The historic lack of interest from the "UFO community," such as it is, has been nothing if not consistent, and it's difficult to see why circumstances would change with the publication of this book.

• Probability of material aid from the UFO community: 0.0001%

ELECTRICAL ENGINEERS

The individuals most likely to repeat the 1994 experiment and build a flying saucer will be independent electrical engineers, particularly those with a specialty in microwaves (radar) or EPR (electron paramagnetic resonance) or knowledge of dynamic nuclear orientation. All the better if they have access to a laboratory and the proper equipment.

The Bureau of Labor Statistics says that the United States currently employs about 316,000 electrical engineers. Global figures were unavailable. On the whole, EEs are more independent and pragmatic than any of the above groups. They are unencumbered with the baggage of general relativity and have been quick to understand the UFT and the principles of gravity control in the past. They also have the technical expertise necessary to assemble the apparatus, whether or not they understand the theory.

Thankfully, a lifetime of experience in Silicon Valley indicates that a goodly percentage of engineers are somewhat eccentric, a precondition for receptivity to our message. While the risk vs. reward assessment might be attractive to someone with an entrepreneurial spirit, engineers are also motivated by more than money: *they like to make stuff work*. That's what they do. They are susceptible to excitement over speculative projects, the bigger the better. Once the thought of building a flying saucer begins to take hold, the "cool factor" might well be sufficient to get a number of them going. This is *not* the way academics think. It is *not* the way the military or the Department of Energy thinks. Nor is it the way venture capitalists or billionaires think, visionaries or not.

What an engineer might see in this book is a readymade chance to go into the garage and come out richer than god with a Nobel Prize in hand. Some engineers already have access to the equipment and a laboratory, particularly if they work in microwaves. This is cause for hope.

Let me emphasize once again, however: *Results are not guaranteed* (read the DISCLAIMER, p. 1). I must also caution engineers against the tendency to want to "improve" on a design. Do not mess with the design unless you have an advanced degree in physics and a thorough understanding of microwave technology. In addition to the 1994 experiment, my father conducted many experiments in aerospace, and engineers seemed ever ready to put their personal stamp on the apparatus, without being particularly concerned with how their "improvements" might compromise the result.

• Probability an electrical engineer will heed the call to action: 1%

CONCLUSION

The question posed in the *Envoi*—"Is this an offer you can afford to refuse?"—now has an answer, and in 99% of all possible scenarios, that answer is "Yup." The foregoing analysis leads us to conclude that the probability of saving the planet, at least by means of the technology offered in this book (assuming it performs as described), is approximately **1.01%**, with the bulk of our hope resting on the shoulders of independent electrical engineers.

But perhaps a revised analysis is in order. Publication of *How to Build a Flying Saucer* might change the outlook for some of the groups above. Where the prospect of a scientific breakthrough and cheap and easy space travel has failed to inspire action in the past, the book may tip the balance in our favor by invoking a pair of ancient demons, the same ones that built a fire under the throne of Ferdinand and Isabella and got them to listen to Christopher Columbus:

Those reliable demons go by the familiar names of *Fear* and *Greed*.

Chapter 13

POTENTIAL OUTCOMES

EITHER THE REPEAT of the 1994 experiment *will work* or it *won't;* there is precious little wiggle room. But for the test to be valid, the apparatus needs to be precisely constructed and tuned. If it isn't, the experiment will fail. We can expect true reports and false reports of success and failure to circulate—probably at the same time—causing a fog of confusion. Groups with vested interests may take advantage of the situation to declare further inquiry worthless, which may or may not be true. One must evaluate the source of such declarations with a critical eye.

This chapter considers a cross-table between "success" and "failure" on the vertical axis and "true report, false report" on the horizontal axis. The permutations are "Success/True," "Success/False," "Failure/True," and "Failure/False."

"SUCCESS!" – TRUE REPORT

Good news, but if the past is any guideline, you will be on your way to the Moon in a personal flying saucer before you read about experimental proof of gravity control in a refereed science journal. If reports of success come from outside of academia, attempts may be made to sabotage and discredit the source. News agencies may participate, wittingly or unwittingly. However, I am optimistic that if *enough* reports of success appear, coupled with *public demonstrations* of the technology, the tide will turn. I am also hopeful that, contrary to expectations, the experimenters will be known and trusted academics, making the results much more difficult to ignore.

Once success has been more or less confirmed, the scientific establishment will probably make an effort to account for it in terms of general relativity. You will hear much jargon-laden gibberish about gravity waves and curved space-time, for example. The solemn cant will *sound* scientific, *very* scientific, and those that promulgate it may well be sincere, but at bottom it will represent an effort to wrest credit from the inventor and protect the status system, which has an *enormous* social and financial stake in the outcome. The tragedy of this would be the loss of valuable R&D time, because the emphasis will be placed on forcing the technology into the Procrustean bed of general relativity, rather than using the UFT to explore further engineering applications.

The experimenter, whoever it is, will probably try to take full credit for the "discovery" of gravity control, never mentioning this book, with ensuing controversy. The timeline will be difficult to refute, however, since my father filed a patent application before publishing the 1981 paper, and the patent search *at that time* showed that his invention was unique. Unfortunately, that will not deter scoundrels of various stripes from trying to take credit, because the stakes are unimaginably high.

Skeptics will vanish into the woodwork like cockroaches, but diehards or paid spokes-mouths will probably remain behind to scoff at the UFT and shore up faith in the GTR. It may take ten years, but eventually their claims will die away, especially when every scientist and engineer in the world quietly drops the GTR and begins using the UFT exclusively to predict results. This is inevitable because the UFT is simple, visualizable, and makes numerical predictions. Any claim to have had a gravitation theory like the UFT prior to 1960, the first date of publication, or an identical technology prior to 1980, will be difficult to support.

"FAILURE" – TRUE REPORT

Some may think that as the author, I would greet the sure and certain knowledge that the experiment had failed with great disappointment. This is not the case.

First, credible-sounding reports may in fact be false (see below), and reliable verification will be needed.

Second, science may be competitive, but it is not a sporting event, and there is simply no such thing as a "failure." No matter *what* the outcome, the experiment will produce useful results.

Third, I would find failure a *relief*. If it turns out that Nature was playing tricks on my dad in 1994, I will be happy to let go of this mission, which has forced me to put many other projects on hold over the last fifteen years, spend thousands of hours writing letters and documents such as the one you are now reading, and endure the condescension of skeptics and "experts" who would never even risk talking to my father, let alone undertaking a modest research program.

Admitting that my father was wrong about gravitation, even though he was right about so many other things, would be painful, since nothing mattered more to him, and he spent a lifetime researching and advocating for his theory. But it won't change my conviction that he was a great scientist, and it will not diminish the rest of his accomplishments. All my life, I have respected his vision of a brighter future created by gravity control. Failure will cause that dream to evaporate, along with my hope that his invention might have put an end to global climate change and shift the geopolitical emphasis on conflict toward cooperation. The future, bleak as it is, will become bleaker, but at least his theory will have been given the fair and impartial test it deserved all along.

"SUCCESS!" – FALSE REPORT

A more sophisticated disinformation tactic would be to claim success, but say that it was necessary to modify the apparatus in unstated ways or that there was no point in anyone else doing it, because researchers discovered that the recipe required all kinds of subtle modifications, and patent applications had already been filed, so why bother.

The poison pill strategy may be employed: The modified setup, whatever it is, will sound convincing, but if anyone should attempt to duplicate it, it will be a costly dud. For example, the experimenters may suggest that pure aluminum with colloidal iron inclusions is not the best material, and something far more expensive is the only thing that works, such as an alloy of *platinum* and chromium, or perhaps a ruby, since rubies are made of aluminum oxide and their color is due to chromium. The flood of bullshit will muddy the water and slow down or discourage other experimenters, and the truth will be lost amid conflicting reports.

"FAILURE" – FALSE REPORT (DISINFORMATION)

Presumably there are groups that have a vested interest in preventing people from repeating the 1994 experiment, and they might well launch a disinformation campaign—perhaps more than one—to pollute the channels of communication and dissuade anyone from acting.

If so, expect not just *one* false report, but *many*. Some will be highly sophisticated and convincing, probably endorsed by a physics professor who is famous for something or other in general relativity. Reports of success and failure may appear at the same time and compete with each other for attention, which will further sow the seeds of confusion. YouTube, Amazon, Facebook and Twitter will buzz with snarky comments from morons and trolls who aren't qualified to critique a matchbook rocket, let alone the UFT. It is possible that some will be paid operatives posing as different people.

How to differentiate true reports from false? The most reliable reports are likely to come from universities in Scandinavia and other countries not burdened with the problems of empire and bureaucracies whose role is to protect the established order above all else. Apart from that, the only certain way is to construct the experimental apparatus yourself and throw the switch (but please read the DISCLAIMER on page 1 before you do).

MOST DESIRABLE OUTCOME

Without a doubt, the best outcome would be to hear multiple reports of success from experimenters around the world, unimpeded by disinformation, with ensuing R&D projects blossoming everywhere, leading to the technological revolution envisioned here. Then the work of stemming global climate change and turning mankind's destiny toward the stars would begin. I would only ask the experimenters to be honorable, acknowledge the source, and contact the author about reviving the 1980 patent filing. There will be more than enough fame and money to go around. After all, neither Bill Gates nor Steve Jobs *invented* the personal computer, yet they did very well indeed.

It is my hope that if the experiment is successful, patent owners will fund a research foundation to explore the implications of my father's unified field theory and the advances he made in

Sommerfeld's Method, optics, and heat conduction; more valuable patents would flow from such an organization. "Antigravity," my father said, was trivial fallout from the UFT. He described several other inventions too incredible to be believed, but he never told me exactly how they would work, which means that others must follow his footsteps to the top of the same mountain.[10]

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[10] *See Appendix F, p. 363*

Chapter 14

THE SHAPE OF THINGS TO COME

THE TITLE OF THIS CHAPTER is shamelessly borrowed from a prophetic novel by H.G. Wells, published in 1933, so as you might imagine, we are about to spin a prophetic tale of our own. But where Wells' vision was dark and bleak, ours will be a tad more optimistic and informed by a faith in good old-fashioned free enterprise and the entrepreneurial spirit.

First, however, can you see any way that someone might make any money from gravity control? Can you write down three examples? Can you imagine five ways daily life might change as a result of gravity control going mainstream?

Done? All right.

Some of you probably had a hard time listing anything at all. If so, you're in good company. Mark Twain thought that Alexander Graham Bell would never make any money off that gizmo he invented called the "telephone," and Twain was the author of *A Connecticut Yankee in King Arthur's Court*, a book about a time traveler lost among a people who have no understanding of science or technology. Similarly, while scouring Silicon Valley for financial backing, I was speaking to a venture capitalist who gave me a skeptical look and asked, "Just how do you propose to make money on this?"

I had to pick my jaw up off the floor before answering. After all, if Mattel can make a fortune on *toy* spaceships and automobiles, what could be made by mass-manufacturing *real* spaceships and privately owned flying saucers for the price of an SUV?

What could be made by transforming the auto industry everywhere on earth?

What could be made on a space-based factory the size of Manhattan, or a space-based resort, or a tourist industry based on interplanetary travel?

What about space mining? I hear there are oceans of water on Europa, Ceres, Pluto, and who knows where else. We need water here, and the new colonies on the Moon and Mars will need it too.

And what about government and military contracts?

What about *Disneyland*, for that matter? What kind of amusement park rides could be designed? You mean people would actually pay *money* for such rides? Nah, of course not.

What will the advent of all these new industries do to the level of economic activity all over the globe, not to mention in off-world colonies and mega-space-stations?

All the traditional avenues to wealth generation are open, from patents, royalties, and licensing agreements to manufacturing thousands of different devices with thousands of patented parts and components to using gravity control to generate secondary industries. These are all the very things that are powering the world economy today, but on a scale unimaginable to our earthbound consciousness. And all of these moneymaking enterprises will be connected by licensing agreements to Patent Zero, the patent derived from the experiment described in this book.[11]

I don't know for sure, but I have a sneaking suspicion there might be a dollar or two to be made in there somewhere. Maybe, if I kind of squint my eyes real hard and peer into the future.

The money question has come up more than once, and it is revealing, because it suggests how incomprehensible a radically new technology can be to people whose minds are enmeshed in the "matrix" of things as they are today.

Seeing outside the matrix isn't easy, as I learned from first-hand experience in Silicon Valley. In the mid-1970s, I took a tour of the Xerox PARC laboratory on Coyote Hill Road in Palo Alto in the company of an old high school friend, Marc LeBrun,[12] who showed me a prototype bit-mapped screen and a mouse. Both were entirely new, and the technology was primitive by today's standards. On the day of my visit, I saw only what appeared to be an electronic Etch-a-Sketch. "What would anyone *do* with something like that?" I wondered.

Ironically, the same bit-mapped screen and mouse were to provide me with employment in 1985, when I was hired as a technical writer by Jef Raskin, the genius behind the Macintosh project at Apple. Jef, who was doubtlessly a genuine visionary, launched the Mac project after seeing exactly the same device I had seen at Xerox PARC ten years earlier.[13]

Steve Jobs failed to see the mass-market potential of what I saw at Xerox PARC, too. When Jef explained the concept of the Macintosh to him—a versatile, low-priced computer with a bit-mapped screen and a mouse, a kind of "information appliance"—Jobs said (according to Jef), "That's a *stupid* idea." The pricey Lisa was the Apple of Steve's eye at the time. A few years later, he realized that Jef's "stupid idea" was the future of Apple and wrested control of the project. Jef resigned immediately and formed Information Appliance Inc., which is where I began working as a tech writer in 1985.

When I tried to interest Jobs in talking to my father in 2000, he balked, saying, "If this is so great, wouldn't Stanford have done something about it by now?" His response was a complete and utter shock. A world-class visionary was the last person on earth I would have expected to look to academic authority for validation. Steve had firsthand experience in how far wrong authority could go when he talked with management at Hewlett-Packard about building the first personal computers. They told him there was no market for such a thing, which led to his forming Apple. Steve distrusted academics so much in the early years of Apple that he made “no academics” a hiring policy. The policy was serious enough to force Jef, who had advanced degrees in mathematics and computer science, to lie on his employment application.[14] So Steve’s newfound faith in academic authority seemed out of place, to say the least. But if my experience in Silicon Valley from 1984 to 2007 taught me anything, it was that insanely great ideas don’t often look that way until they are viewed in the rear view mirror, and the ones that look that way at first blush are often failures.

That, in a nutshell, is the reason for this chapter. By dramatizing the everyday reality of a world where gravity control is an accomplished fact, not a theory or a fantasy, I hope to let some light into the gap between the thing and the idea, the motion and the act, and banish the pesky shadows.

The only time my dad commented on the dollar value of gravity control, he said that within five years of going mainstream it would be roughly worth the combined GDP of all the industrialized nations on the planet. But the venture capitalist who asked “How are you going to make money on this?” had not the slightest inkling of that. To him, gravity control was little more than a laboratory curiosity.

A DAY IN THE LIFE OF A YOUNG, UPWARDLY MOBILE PROFESSIONAL, 2057 AD

The following vision evolved slowly, thanks to many attempts to make Silicon Valley investors understand the implications of the invention during the years 2000 – 2007. I was able to confirm the feasibility of most of the devices described here in conversations with my father. Other inventions he predicted but was never able to confirm with experimentation have been left out.

“(**$$**)” indicates products, services, or commercial activity generated by gravity-control technology.

Orientation: It has been four decades now since the technology of gravity control went mainstream after a high school student who wanted to do something interesting for a science fair followed the instructions in this book and rebuilt the 1994 experimental apparatus in his garage with the help of his father, an electrical engineer. Today that kid, now middle-aged, is one of the richest people on or off the planet. But our story doesn’t concern him. It concerns someone far downstream from the early days of gravity control, someone perhaps like you.

You are a latter-day “space yuppie,” a young sales executive at Interplanetary Designworks, Inc. (IDI), a company that builds a wide variety of space stations serving the needs of industry and entertainment (**$$**). You began working at the company fresh out of college, and seven years into your career (**$$**), you are just a trifle more prosperous than your yuppie counterparts in 2017.

As for the Editor, he is still around, 107 years old and sitting in a wheelchair on the lawn of an old age home in Pasadena with an IV bottle dangling over his head and a twenty-something nurse nearby, reading a magazine, but don't bother visiting—he's long since forgotten writing this book. Even the flying saucers whizzing by over his head on their way to Los Angeles fail to remind him of it.

6:00 AM: The alarm goes off next to the bedstead on the second floor of your humble, ten-room log cabin deep in the Rocky Mountain wilderness (**$$**). Music for Zen meditation fills the air. You never had much use for buzzers. And the shakuhachi flute and meditation bells set the tone for today's business.

You roll out of bed and stagger over to the picture window, rubbing your eyes. "Curtains open," you say. The curtains roll back, revealing a panoramic view of distant jagged peaks cloaked in snow, and a pristine alpine lake surrounded by virgin forest at the base of the steep mountainside below your cabin. Thunderheads gather over the peaks on the northern side of the lake ten miles in the distance. You never tire of the ever-changing view. Right now, the billowing anvils of white and charcoal gray seem to be seething higher while you watch, as if in time-lapse photography. But it could spell trouble. You don't want this to be a work-at-home day.

"Weather at seven?" you inquire in the empty room. "Sixty-two percent chance of rain with lightning," says the home management system, which has a link to the national weather service satellite. Maybe if you hustle, you can outrun the storm. Today's a big day—you don't want to be late.

While taking a shower, you reflect on your good luck. What would you be doing now if you hadn't gotten in on the ground floor with a trillion-dollar company? Probably selling real estate in Anaheim instead of selling custom-built space stations to seventy-two different nations (**$$**).

The cabin was a sweet deal. Your last sales commission allowed you to build it deep inside Rocky Mountain National Park, elevation just under 10,000 feet (**$$**). Great bachelor pad. Peace and quiet. Fly-fishing when you feel like it (if only you had the time). All you had to do was work out a remote-dwelling lease with the National Park Service. You built a fire lookout on your property, made a hefty donation to the park service (**$$**), and they leased the land to you for ninety-nine years, as long as you maintained the lookout.

A lot of deals like that were struck at the beginning of the remote-dwelling craze: national parks, remote islands in the Pacific and Indian Oceans, the valleys and summits of the Andes—places where no-one ever lived before became suitable for commuters like you (**$$**). Building the cabin would have been impossible without gravity control, too (**$$**). Sitting high up on the side of a mountain? No roads? No electricity? No plumbing? But you had all of that put in (**$$**). It wasn't cheap, but in the old days the project simply wouldn't have happened. With gravity control it was easy to move the materials up the mountain to the site (**$$**) and get the builders in and out (**$$**). You modeled it after the spectacular Beaver Meadows Visitor Center at the park entrance. Frank Lloyd Wright was way ahead of his time. It was almost like he knew gravity control was coming.

But then there *was* the daily commute to Los Angeles (**$$**). Nine hundred-fifty miles. It could be a hassle, but it only took forty minutes on average. Oh well, better get cracking.

6:51 AM: Your saucer (**$$**) sits on a platform in a clearing in back of the cabin, a dull bluish-gray. The disc is seventeen feet across, roughly the length of an old Ford F-150 truck. Strictly speaking, it isn't a saucer, but more of a croissant. There's a crescent-shaped cutout across the back and twin engine hubs on either side of the cockpit. The cockpit dome is the latest—that new kind of aluminum (**$$**). It's opaque now, but when you power up, it becomes transparent. Very cool. The engineers knew what they were doing. Just a quarter of a century ago they were making old-fashioned automobiles. But they were a forward-looking company; they moved fast to get beyond the "mileage enhancement appliance" stage, an add-on that reduced inertia in conventional vehicles (**$$**). And look at them now — manufacturing the best luxury saucer on the market (**$$**).

You're zipping your flight suit (**$$**) on over your business attire as you climb the steps to the platform, carrying your notepad in your other hand. Roiling thunderheads are cresting the mountains, casting shadows on the valley now, but there's no time to admire the view. Occasional lightning flashes and the distant rumble of thunder suggest you might be grounded momentarily, and you can't be late. The park ranger drops his binoculars and waves down at you from his post in the lookout platform. You wave back. Ranger Mike comes and goes the old-fashioned way, on horseback. But he does have a pair of drone orbs (**$$**) he can launch any time reconnaissance is needed.

The charging cable (**$$**) decouples from the belly of your saucer and retracts below the platform as you open the dome with a biometric key (**$$**) on your notepad. Solar cells (**$$**) collect energy during the day and begin charging the saucer's capacitor (**$$**) as soon as you touch down after dark. When you're in L.A., your saucer is plugged into a charger in the storage garage (**$$**) or you swap it out for a freshly charged module (**$$**). Your saucer rarely needs a charge, however, because you have a secret power source (described below).

Your saucer is a two-seater (**$$**). The salesman (**$$**) called it a "sport saucer." The model is the "Europa," in honor of Saturn's icy moon. A lot of water on Europa (**$$**). IDI is building a space station out there. You had a hand in closing the deal, which was worth $100 billion all told (**$$**).

You hop into the pilot seat and the dome closes. The airtight seal (**$$**) engages and the cabin pressurizes. The instrument panel (**$$**) lights up as the gravity-control unit switches on beneath your seat with a faint hum (**$$**). "Destination?" asks the AI pilot (**$$**). His voice was borrowed from a certain starship captain in an ancient TV series—"Picard," was it? The Shakespearean accent is supposed to inspire trust and confidence, and in fact it *is* rather effective. You've nicknamed him "Horatio," for Hamlet's BFF. This is your fourth saucer, and the best of the lot (**$$**). Horatio has followed you all the way.

"Work," you say. There's a pause while Horatio consults with the national air traffic system (**$$**).

“Three routes available, sir,” he says.

“Display.”

The holographic map (**$$**) inside the darkened dome shows the western United States with three zigzagging lines connecting your house and downtown Los Angeles: red, green, and blue. Each route displays the ETA at the landing area near the IDI building. All of them are under one hour. All calculated by FAA computers in under a minute (**$$**). No such thing as a traffic jam with a saucer; rarely a delay of any kind (**$$**). You’ve seen photos of the old days, when traffic jams turned freeways into parking lots. Thank god you were born after that time. How many years did everyone waste just sitting in a creeping rhumba line of cars, breathing noxious fumes and gulping blood pressure pills?

“Blue, Horatio.”

“Ah, the scenic route, sir. Excellent choice.”

The red and green routes disappear from the map as the hologram shrinks to an eight-by-ten-inch window on the surface of the instrument panel (**$$**). The dome fades from opaque to transparent and the mountains, the lake, and the towering thunderheads all come into view again, as if through sunglasses. A gauge on the instrument panel (**$$**) displays the weight of your saucer. It bounces around as the effect takes hold: 2517 pounds, 2550, 2100, 2213, 1625, 1685.... Warming up usually takes two minutes. Suddenly the numbers cascade downward—1200, 972, 540, 210, 87, 65, 21—a bell sounds.

“Weightless, sir,” says Horatio. Your body feels like a dandelion, floating beneath your body harness.

“Lifting off.”

The saucer begins to rise slowly, like a helium balloon. The analogy is accurate: Your vehicle displaces a volume of air greater than its current weight, which is nearly zero, so buoyancy lifts it off the ground. Only the faintest sensation of movement accompanies liftoff; when you’re underway, there is none. It is as if the ground is pulling away from you, not *you* away from the *ground*. At one hundred feet, the air jets hiss (**$$**), steadying you. The gravity control system adds a little ballast to the vehicle to establish equilibrium. The Europa rotates slowly and steadily, a side effect of the gravity-control system *(see p. 148)*. Your altitude above the mountainside is a hundred feet, treetop level. You can see the roof of your cabin below, but your altitude above the valley and the lake is 3,000 feet.

“Checking flight path,” says Horatio. “Please stand by for authorization.” All routine now, but still spectacularly thrilling.

This is an AI flight (**$$**), like taking a taxi in the old days. Except Horatio is a better driver. You can choose from a spectrum of autopilot interfaces on antigravity vehicles, ranging from a “full service” autopilot like Horatio to full-manual control, which is rare and restricted to low-performance vehicles, many of which can fly no higher than thirty feet (**$$**). Full-manual piloting requires special training, licensing and security checks (**$$**), and the interfaces are extremely expensive, which is why almost all manual pilots are military (**$$**). Even then, they use a hybrid smart-control system with built-in collision avoidance systems (**$$**). That’s fine with you, as you enjoy the view during the first part of the ride, and you like to read the newspaper (paperless, of course, downloading now while you hover - **$$**) once you reach full altitude. Let Horatio worry about navigation, altitude, weather, traffic.

You are being tracked at all times (**$$**). In the unlikely event of an inflight emergency, Horatio will land the Europa—on any flat surface larger than one hundred feet in diameter—and a service vehicle (**$$**) will arrive within an hour to give you a ride and tow your saucer (**$$**). In case of gravity-control failure, a well-concealed parachute opens (**$$**). In the event of *catastrophic* failure, the cabin capsule ejects from the vehicle and parachutes to the ground (**$$**). Failures such as these occur far less often than auto accidents used to in the old days, and the injury rate is far lower—almost nonexistent, though the ride down can be exciting.

Fear of flying and fear of robots was one of the reasons it took a while for the public to accept vehicles like the Europa. In the beginning, the demand was for low-flying, fan-powered hovercraft that flew at “safe and comfortable” speeds, up to 120 mph, and had optional autopilot safety features (**$$**). But gradually confidence built, along with engineering standards. And now? Los Angeles looks like a beehive on any given day, with swarms of saucers and space vehicles entering and exiting the heart of the city (**$$**), but the traffic flow is programmed like a Swiss watch and the air is as clean and clear as it was in the days before the arrival of civilization on the West coast.

You enjoy the 360-degree panorama of the valley provided by the lazily turning saucer for the few seconds it takes to obtain FAA clearance. The instrument panel shows that your external flight lights (**$$**) are blinking. Your craft can be seen from miles away. The Europa has a variety of stabilizers and backup stabilizers, including computer-controlled (**$$**) electromagnets, compressed gas jets, and fans (**$$**). But there’s plenty of room onboard, since all of the stabilizers are small and weak, but their effects are magnified once gravity and inertia have been canceled.

Propulsion is provided by a pair of turbojets (**$$**) inside the flight stabilizer humps alongside the cabin. These clean-burning jets would have powered a small model airplane in the old days, but they are more than sufficient to get you to Los Angeles at Mach 3 now.

Turbojets are only one of a variety of propulsion systems available for gravity-control vehicles (**$$**), but it was decided long ago that only the military and exceptional civilian agencies would use advanced electromagnetic drive systems (**$$**), which were capable of Mach 18 or better. Electromagnetic drives are silent and require no combustible fuel, so they are easily capable of exiting earth’s gravitational field into space. The vastly different requirements of space travel and terrestrial travel, plus the added expense of an electromagnetic drive, meant that civilian drivers were restricted to various kinds of compressed air, fans, and jets for normal use. In addition to the advanced technology, spaceworthy vehicles require special training (**$$**) and permits (**$$**), as well as heat and radiation shielding (**$$**), celestial navigation equipment (**$$**), and so on. However, civilian space vehicles are available, and you will be taking your clients up to the IDI showcase station in one of those today.

Your jets will propel the Europa at more than 2000 miles per hour. The first time a human being traveled at Mach 3 was a hundred-and-one years ago, when Captain Milburn Apt of the U.S. Air Force dropped his Bell X-2, a swept-wing experimental jet, from a carriage under the starboard wing of a Boeing-50 propeller-driven Superfortress at 31,800 feet over Edwards Air Force Base, California, and fired his rockets. The X-2 hit Mach 3.196, but the plane went into a violent roll at supersonic speeds.

Apt ejected, but he was killed and the plane exploded. The reason the X-2 went into a roll was not a problem with aerodynamics. It was conservation of angular momentum. The phenomenon, which was unknown until the advent of supersonic aircraft, is called “inertial coupling.” It occurs when the pilot tries to make a turn at supersonic speeds, and the inertial forces on the wings and fuselage get into a fatal argument.

Inertial forces are *unknown* on the Europa, so you can do something undreamt of in 1956: make sharp turns at supersonic speeds. *Very* sharp turns. The notion of a world in which gravity and inertia are no longer inevitable was so incomprehensible at first that private saucers were programmed to make smooth, banking turns only, so as not to frighten the passengers. You, however, were born fifteen years after the revolution began and have never *known* a world where gravity and inertia were not malleable. For you, right-angle turns at supersonic speeds seem normal. All you had to do was push the “Accept” button for high performance and choose the parameters when you set up your craft.

Your commute craft is clean and green. Getting to L.A. will take less than four gallons of alcohol (**$$**). Once you’re traveling at speed, thin scoops under the wing divert air to a turbine that powers the antigravity unit (**$$**). This allows you to stay airborne almost indefinitely. The air slits and the turbines add a muffled hiss to the background noise, but it’s a small price to pay for the added range.

Aside from your mini-turbines, the electrical energy required to charge your vehicle comes from solar, wind, geothermal, hydroelectric, and space-relay sources (**$$**). It is stored in hyper-efficient onboard lithium-ion batteries and the main capacitor (**$$**), which powers the gravity-effect generator during takeoff. By 2017 (**$$**), the year that gravity control was released, Tesla Motors had already made significant breakthroughs in battery technology, and the forward-thinking company rode the boom, literally to the stars. It wasn’t long before the rest of the world wanted in on the act (**$$**). Patents and licensing agreements made billions for the company’s shareholders (**$$**).

Your flight time will be roughly half an hour, but with takeoff, landing and parking rituals, plus the time it takes to walk to the office from the saucer storage area, you will step through the door of the office at 8:00 A.M. Might even have time to pick up a cappuccino-to-go at Starbucks.

7:02 AM: The Europa swings around so that its leading edge faces west, the turbojets ignite, and you instantly accelerate to 400 mph. A camper or hiker standing below you would hear only a faint hiss as you passed overhead. If he blinked, he would miss you. Inside the soundproof cabin, you hear nothing, not even the air brushing past the hull. A side effect of the gravity control system is a layer of ionized gas on the surface of the saucer, which makes flight almost frictionless and enables your craft to reach supersonic speeds effortlessly, without sonic booms. Again, because of the absence of g-forces, it seems as if you are resting comfortably in the virtual world of a flight simulator, rather than accelerating to Mach 3.

"Canyon route, sir?"

"Sure, Horatio, but get me to L.A. on time."

"Of course, sir."

The Europa dives through a series of canyons on its way out of the Rockies. It's a route you love to take every morning, but today it keeps you below the roiling air currents above. It takes three minutes to reach the foothills. By then, the storm is behind you and the sun is at your back.

"Climbing to 40,000 feet," says Horatio. Your altitude is a function of the attitude of the craft, jet propulsion, and buoyancy; it has nothing to do with aerodynamic lift. Since your jet fuel is oxygen-dependent, your vehicle is not space-capable. Nor do you have the permits to exit the Earth's atmosphere. Your company saucer? That's another story.

Horatio angles upward to cruising altitude on a steep trajectory, but no g-force pushes you back in your seat: You're wrapped up in a news report on a Mars mining operation that discovered something interesting below the surface yesterday: *fossils!* The science is fascinating, but you see something more in that headline—a *business opportunity* (**$$**).

9:00 AM: Your visitors arrive at IDI, an international group that includes investors from Japan, the United States, Mexico, the United Kingdom, and France. You usher everyone into the conference room, where you are joined by the CEO and six staff members. Everyone is seated and a light breakfast is served. After introductions are made and smartphones capture business cards, the head of the delegation speaks.

"As you know," says Mr. Mikami, "We have been developing luxury resorts for thirty years. We specialize in remote destinations, Shangri-La oases in the Himalayas, Bora Bora, Patagonia, Alaska, the Canadian Rockies, Southeast Asia, the South Seas (**$$**), but nothing in space. Our new concept is for a kind of Zen retreat with panoramic views (**$$**) of the stars and the Earth (**$$**). We want to create an environment conducive to spiritual renewal and awakening. The idea is to cater to roundtrip customers, or visitors on their way to or from the Moon or Martian colonies. You have read our preliminary plan?"

"Yes, I have, and I think that IDI can make your wish list come true. But rather than spend the morning looking at a slideshow, why not go upstairs and see our latest project."

No special preparation is needed for the ride into space. You simply conduct everyone to the rooftop landing area, where the company's spherical shuttlecraft awaits.

9:30 AM. You arrive at the company's latest space station project (**$$**), 249 miles above the surface of the Earth. The flight itself took roughly three minutes, as the company shuttle uses electromagnetic drive and the vertical distance is negligible (**$$**). Once it becomes weightless and inertia-free, the pilot uses buoyancy to lift off like a hot air balloon to takeoff altitude, and after receiving clearance from the traffic controller, he switches on powerful electromagnets (**$$**) in the belly of the craft that rappel off the Earth's magnetic field. After a brief hovering period while you wait for clearance, the acceleration to 5,000 mph occurs almost instantaneously. Your guests, who are seated in outward-facing chairs in the observation room, would say they felt more g-force in an elevator. The Earth simply pulls away on the wraparound monitor as if the camera lens were zooming out. As Earth's gravitational field doesn't resist your ascent, there is no necessity for achieving "escape velocity."

Once you near the space station, which is only half complete, you have the pilot, who is certified for manual flight, maneuver around so that your guests can appreciate the sheer magnitude of the project. Slated to become earth's first full-fledged, permanent space colony and deep-orbital trading outpost, the framework is five miles long. Construction takes place in a relatively low, geosynchronous orbit, so that materials (**$$**) can easily be brought to the site, both from the Earth's surface and from space factories on the Moon and in the L4 and L5 industrial zones (stable orbital points on either side of the Moon) (**$$**). While docking, you pitch IDI's record of achievement. When the colony is complete, it will be moved 183,000 miles farther out to the L5 zone (**$$**).

"The spiritual dimension of space travel was one of the unexpected side effects of gravity control," you say. "IDI recognized this early on and began constructing stations to serve the needs of many of the world's great religions (**$$**). You are the first to bring us a project with a Zen theme, however. We would work closely with you to establish an environment that captures the spirit of a Zen temple, but with modern elements."

"Just how flexible can you be, when space imposes so many restrictions on architectural design?" asks the French delegate, a young woman about your own age. It is impossible not to notice that she is quite attractive. "Dr. Trouviere," she reminds you when she catches you at a loss for her name.

"I think you'll be surprised at what we've been able to accomplish in our latest project, Dr. Trouviere. Ladies and gentlemen, welcome to orbital station *Athena*, planet Earth's third international space colony, and, I think you'll agree, its best yet."

8:30 PM: You are seated in a cool leather chair in the CEO's office atop the IDI building in downtown Los Angeles. The night sky hums with firefly lights from private and public air traffic ascending and descending throughout the city in a constant hum of activity (**$$**).

"Impressions?" says your boss, handing you a scotch on the rocks.

"I think they were impressed with Athena."

"Who wouldn't be? But are they *buying?"*

"We only have two competitors for an operation on this scale (**$$**). And we have exclusive leases on those L5 spots (**$$**)."

"Did anyone mention piracy?"

"Well, yes, they did, and I reviewed our security measures (**$$**) as well as our contract with Space Protective Services (**$$**) and the United States Space Force presence in the area (**$$**)."

"Bottom line?"

"Mr. Mikami is staying in L.A. I'm meeting with him on Wednesday. Should have a decision then."

"Bring me up to date on the other projects in the pipeline."

"The proposal for a permanent film studio in space is still being reviewed (**$$**). We have got four bids on the proposed entertainment module for the Mars station (**$$**). The buyout of Space Transport and Construction Co. is proceeding (**$$**). And our subsidiary, SaucerDock, has sealed the deal on parking software and infrastructure for Boise, Cheyenne, and Santa Fe (**$$**).

"Good work. Why don't you take the weekend off?" Your boss smiles with a sardonic smirk. He knows how many weekends you've spent with nose to grindstone—the price of a booming market.

"Well, there's one more thing. Did you hear about the fossils on Mars?"

"Yeah. Big news."

"If we move quickly enough, we could establish a museum base near the site, say, as an entertainment spot for miners, colonists, and scientists, and piggyback that with expeditions from the colonies or from earth to 'see the fossils live'—in situ, that is (**$$**)."

"Sounds possible. Can you work up a report by next Friday?

"Done."

9:40 PM: You are cruising eastward at Mach 3, 40,000 feet over central Utah. Your ETA in New York is one hour, but Paris is your ultimate destination. Dr. Trouviere, or "Corinne" as you've come to know her, is strapped into the copilot seat on your right. She is hitching a ride back to the Continent. There's been a lull in the conversation, and you are tempted to fill it.

"You know where you want to eat breakfast?"

"Mm, there's a little place near Canal Saint Martin (**$$**)."

In a few seconds you find the landing site in Paris and book a reservation (**$$**).

Corinne smiles. "Don't worry, you are off the hook."

"I am?"

"For being late. I would say a weekend in Paris (**$$**) more than makes up for it."

"I thought we'd stop off on the way there (**$$**)."

"Sure, why not. Anywhere, so long as it's not trout fishing. I know you like it, but I am sorry. Where did you want to stop?"

"New York, and in the morning, Turks and Caicos."

"Where is Turks and—what is it?"

"*Caicos*. It's in the Caribbean. A set of coral islands. An archipelago. Most of those islands would be underwater right now, you know, if global warming hadn't been stopped."

"I don't know, all that was before my time."

"It used to be a big deal. Not too long ago, either."

"Of course, but you know what is a big deal for me?"

"I can't imagine," you say, glancing across the cabin at her. Corinne smiles impishly, a bang of auburn hair veiling her right eye.

Suddenly you both laugh. Finally, work is behind you. It's going to be a glorious weekend.

BEYOND THE SCENARIO

To get an idea of the social and economic impact of gravity-control technology, one need only begin adding the phrase "gravity control" to any engineering problem where gravity and inertia enter into the equations. This includes trains, planes, drones, automobiles, turnpikes, ski lifts, amusement park rides, cranes, forklifts, dry-dock facilities for boats, yachts, ocean-liners, tankers, and high-speed machinery of all kinds. All of these are moneymakers, and as the technology spreads, the mint will be burning up to keep pace with the economic expansion.

As the technology spreads, the world will enjoy an economic boom far greater than that caused by personal computers and broadband technology. We will see a mass mobilization of industrial resources not unlike World War II, but without the bombs or battlefields. One might argue that when fewer workers can move more freight, there will be fewer jobs, but we would argue the opposite, because projects that have been held back by high costs or engineering barriers will suddenly become feasible, as well as projects currently beyond imagining.

Another source of jobs will be the overhauling of infrastructure, which will be carried out by private enterprise and government agencies. Mass transportation and private vehicles will require a total makeover, probably several generations of makeovers. The demand for computers and software will explode, as computerized guidance systems and traffic-control are installed to accommodate a mix of preprogrammed air traffic and free-flying vehicles moving in a broad spectrum of speeds and altitudes, ranging from hovercraft to space vehicles.

As a consequence of increased speed and ease of transportation, the farthest corners of the world will become neighbors: Surfers will be able to catch a morning wave in New Zealand and an evening curl at Malibu. Businessmen will be able to attend meetings in Moscow, Paris, and New York in a single day. Office workers will be able to commute to San Francisco from a cabin in the Sierras or a suburb of Denver. Soon the whole world will begin to resemble Alaska, where light planes are currently the major mode of private transportation. But there will be differences: Gravity control vehicles will be able to take off vertically in any weather conditions, making the whole world a runway, and they will fly far faster than conventional aircraft, including the fastest jets in the skies today.

Freed from gravity and inertia, architecture and construction will run wild—in the vertical *and* horizontal dimensions. New forms of buildings and private dwellings will sprout like mushrooms, not only in cities, but in areas such as islands and mountaintops that have never before been considered viable housing sites. Bora Bora will become an address like any other.

By 2024, the world will be experiencing a frontier movement not seen since the Wild West era in the United States. The mid-1800s was a perfect storm of seemingly unlimited territorial expansion, the Gold Rush, and powerful new technology, such as the steam engine, transcontinental railroad, mass manufacturing, and the increasing speed and freight carrying ability of oceangoing vessels. In 2024, space and the formerly remote corners of the world will be the new frontier, gravity-control vehicles will be the covered wagons and steam engines, and giant space stations and lunar or Martian colonies will be the land-rush destinations, while the asteroids, outer moons, and planets will be the new Slitter’s Mill, Virginia City, and the Klondike. Fresh water can even be mined from Ceres or Io and brought back to Earth or the space colonies. Energy itself will become a hot new mining prospect.[15]

SOCIETY AND CULTURE

As hinted in the scenario above and above in *Chapter 11*, *pp*. *60 – 61)*, the conquest of space has a spiritual dimension. It is impossible to predict what its effects will be, since space travel by human beings on a mass scale is an event without precedent, but astronauts have all reported a humbling sense of awe when viewing the Earth from space. Author Frank White coined the term "overview effect" to describe it, and predicts that as it spreads it will become increasingly difficult to sustain the tribal and national conflicts that rely on an "us and them" mentality.

Societal conflicts are fed not only by suspicion of "the other," but by territoriality and a sense of limited resources. The opening of the space frontier will undermine the notion of scarcity, which models life as a zero-sum game, where every winner has a matching loser. This encourages cutthroat competition, wealth-hoarding, and austerity, which in turn aggravates tensions between nations, religious groups, and the haves and have-nots. The new technology will not reward behavior of this type. Rather, freedom from gravity and inertia will create a sense of wonder at a whole new world of technological toys and experiences, as well as a renewed faith in science and the power of the human mind to overcome all barriers. In effect, it will do for the physical world what computers and the Internet have done for the world of communication: annihilating the barriers of time and space and language that we take for granted today. There will be a feeling of cutting loose from ties to the past and looking forward to a wide-open future. It will also stimulate a wave of optimism, inventiveness, entrepreneurial spirit, individualism, and social change. In the absence of reinforcement, the scarcity mode of thought and its associated negative behaviors are likely to loosen their grip on the body politic. Leaders who embody these values will find it more and more difficult to hold office and will adapt.

Gravity and inertia have always limited how far we can go, how fast we can get there, and what we can take with us. Gravity control means freedom for humanity on a scale never before known. Free from limitations of gravity and inertia, what kind of cities would we build, and where? How far away would New York, London, Paris, Moscow, Bali, Tokyo, or Peru seem to businessmen and tourists when they are all as close as the nearest 5,000-mile-per-hour airbus? Where would you go for a weekend adventure when highways on the ground became highways in the sky? How far would you live from work when travel between San Francisco and New York shrinks to an hour and you can land on a parking lot in the middle of the city? How about building colonies on the Moon? Terra-forming Mars? Mining the asteroids? Constructing factories and cities in space? What if we could tow multimillion-gallon tanks of water from Europa to feed domed cities on a terraformed Mars or irrigate the agricultural valleys and plains of California and the Midwest? What manufacturing processes and entertainment attractions would be possible in zero-gravity environments, not only in space, but here on Earth?

All of these ideas will move off the pages of a sci-fi novel into reality if one small experiment is a success.

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[11] *My father filed a patent application in 1980. For more, see p. 363.*

[12] *Tip of the hat, Marc.*

[13] *Elsewhere (p.* *10**) I mentioned having known only three geniuses in my lifetime. Jef Raskin was the second. The third was Marvin Mudrick, iconoclastic English professor and Provost of the College of Creative Studies at UC Santa Barbara, 1967–1984. Dr. Mudrick passed away in October, 1986. Jef died of pancreatic cancer in 2005.*

[14] *Jef was Apple employee No. 31.*

[15] *Current technology would allow the conversion of solar energy into microwaves which could be converted back into electricity on Earth. Read the award-winning proposal of the interdisciplinary Space Solar Power D3 team at* http://www.nss.org/news/releases/NSS_Release_20160307_SSPD3.html

PART IV

Seven Milestones

All great truths begin as blasphemies.

— George Bernard Shaw

Chapter 15

MILESTONE I, 1954

“Surely You’re Joking, Dr. Alzofon”

THE FOLLOWING is a fictionalized account of my father’s meeting with Richard Feynman, which occurred in 1954, when I was four years old. The meeting, it’s safe to say, was a fact, as he told the story many times over the years without variation or embellishment. He was always respectful of Feynman, if not awed, and he dedicated his final paper on the UFT to him (*see p. 269*), probably as a way of saying “Thank you” for the inspiration he got from this pivotal event.

PASADENA, CALIFORNIA, CAMPUS OF CALTECH

“Maybe,” thought Richard Feynman, “*maybe* I should reconsider my open-door policy during office hours.” Now here was a complete stranger sitting across the desk from him, a nobody who wanted to talk about a unified field theory—his *own* unified field theory, not Albert Einstein’s.

This was going to be a waste of time, and Dr. Feynman, Professor of Theoretical Physics, didn’t appreciate anyone wasting his time, unless it was himself. He continued bouncing a tennis ball against the wall of his office, barely glancing at the interloper, a dark-haired young man who seemed like a lot of other graduate students: far too serious. *Well, perhaps we’ll play with him for a minute or two and send him on his merry way*.

“What did you say your name was?”

“Frederick Alzofon. I’m a great admirer of your work, Dr. Feynman.”

“And where did you say you were from?”

“UC Berkeley.”

“Working on your doctorate?”

“Yes.”

“And what do we have here? Something about a unified field theory?”

“It’s a draft of a paper.”

“Well, let’s have a look.” Feynman caught the tennis ball in one hand and pulled the paper across the desk with the other. “Mind you, I can’t read this in detail,” he said as he scanned the pages. *Hm*, the guy knew his math, but he had an irritating way of numbering his equations: *“1.10, 1.25, 1.35...”*

“A dollar-ten, a dollar-twenty-five, a dollar-thirty-five...” Feynman counted off with mock seriousness.[16] He glanced up. The young doctoral student wasn’t smiling. Maybe he was just intimidated. Feynman kept reading, flipping pages. Now he began to catch the drift of the fellow’s thought. The little upstart wanted to start from scratch, sidestepping the general theory of relativity entirely and pulling a unified field theory out of *special* relativity!

Professor Feynman stood up, smacked the paper with the back of his hand and shouted, “You’re a real *sonofabitch*, aren’t you!”

” *You’re* a sonofabitch,” said the interloper without missing a beat. Weirdly unruffled. Not even angry. Well, this conversation had taken an odd turn, hadn’t it?

“Where are you from?” Feynman asked.

“Santa Barbara.”

“Before that.”

“Detroit.”

Ah well, that explains it, Feynman thought. He sat down again without another word and started reading. After a couple more pages, he glanced up.

“You eliminate the infinite zero-point energy.”

“Yes.”

He smiled. “Good. I like that. But where are you going with this? How wide is your net?”

“The theory includes classical and relativistic particle mechanics, electromagnetic fields, the classical gravitational field, a model of inertial and gravitational mass, the equivalence of matter and radiation, quantum mechanics, and a means of extending the theory without infinities to subatomic processes.”

Feynman rubbed his chin. “Ambitious. But realistic?”

“The basic ideas aren’t new, but they are well accepted. All I’ve done is put them together in a new way. And yes, I think it’s realistic. It’s *more* realistic than presently accepted theories, since the potentials of the fields characteristic of the theory do not possess any infinities, like the Coulomb potential and the static gravitational field—Newton’s Law.”

Feynman leaned back in his office chair and put his fingertips together in a steeple. “Well, you know a thousand times more than most people who come to see me. *But*—you’ve got a *long* way to go yet before this is publishable.” He smiled.

“I know.”

Always serious, wasn’t he. Well, give him some encouragement.

“I think you might be onto something with this,” said Feynman two hours later, after attacking the theory from a number of angles and failing to break it. “Physics needs a new and simple idea. Go home! Polish it up! Publish!” He smiled as he returned the young man’s paper.

Frederick Alzofon shook Dr. Feynman’s hand and left. The southern California sun was casting fuzzy shadows with its golden light as he walked across the campus toward his car. Students wandered between classes, and sat on benches and under shady trees, reading books. He envied them. He had wanted the academic life, the ivory tower, but the Darwinian reality on the inside, he found, was much different from the motto over the front gate, “Fiat lux” (“Let there be light”). Some professors—like Lenzen, Evans, and of course Feynman—stood for everything he held sacred. Others—like Oppenheimer, Lawrence, Teller, Birge—were enough to make him want out.

The talk with Feynman left him energized, his mind swirling with new ideas, new plans. “If Feynman didn’t reject my ideas wholesale, maybe Einstein would be interested after all,” he thought. “Well, why not? I’ll write to him.”

With a pregnant wife, two young children, and a new job as a physicist at the Santa Barbara Research Center, he barely had time to sleep as it was. Every spare moment was already taken up with his dissertation: *Multiple-Valued Functions and Sommerfeld’s Method*. It still wasn’t done, and it had *nothing* to do with unified field theory. But somehow he would find a way. He had to. Something like *this*, something that could make it easy to get into space? He could never let go of that. No matter what it took, he would do it. And aerospace was as good a place as any, if not better.

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[16] *Like most of the rest of the story, this part comes straight from my father.*

Chapter 16

MILESTONE II, 1955

A Letter to Dr. Einstein

THE FOLLOWING LETTER TO ALBERT EINSTEIN is dated February 22nd, 1955 (source: photocopy from A. Einstein Archive 59-093). It is evidently a clarification of an earlier letter sent in October, 1954, probably a few months after the meeting with Feynman, which my father said was in 1954. Unfortunately, the Einstein archive didn't have the October letter, which apparently included an early paper—perhaps the first—on the UFT. Einstein didn't reply, but this indicates nothing one way or the other, as he was by this time one of the most famous men in the world and busy with a flood of correspondence among other things. Unfortunately, Albert Einstein died April 18th, 1955, roughly seven weeks after the letter below was sent.

The October 1954 letter and accompanying paper, if they still existed, would probably give the flavor of the conversation between my dad and Professor Feynman described in *Milestone I*. The 1960 paper on gravitation (*Ref. 1a, p. 347)* undoubtedly contains many of the same ideas. However, this was by no means their final form, as can be seen in *Part VII (p. 229)*, *Chapter 38 (p. 269)*, and other papers referenced in *Appendix C (p. 347*, 2, 4, 7).

SANTA BARBARA RESEARCH CENTER

SANTA BARBARA MUNICIPAL AIRPORT

GOLETA. CALIFORNIA

TELEPHONE SANTA BARBARA 85341

22 February 1955

Dr. Albert Einstein
Institute for Advanced Study

Princeton, New Jersey

Dear Dr. Einstein:

In connection with the paper entitled “Unified Field Theory and ‘Virtual Processes’” sent to you 8 October 1954, there are some elucidating remarks which should be added to the manuscript. Unless otherwise stated, page and equation numbers refer to the ms in question.

A recent discussion with Prof. G. Y. Rainich at the University of Michigan has indicated that the term “quadratic simultaneity” is a misleading one. The motivation for introduction of the term was the existence of two equivalent derivations of the Lorentz transformation (cf. reference of note 9, “On the Electrodynamics of Moving Bodies,” p. 46). That is, the concept of simultaneity leads to linear relations, among which is the fundamental one exploited in your paper (op. cit., p. 42)

$$t_B - t_A = \frac{x_B - x_A}{c - v}$$

and which lead to the Lorentz transformations (op. cit. pp. 44-48). On the other hand, the requirement that a spherical light wave have the same form and velocity of propagation in both a stationary and a moving reference system is stated in terms of a quadratic expression, and again yields the Lorentz transformation. My essential aim was to show that the two criteria were not equivalent if the light signal suffers fluctuations due to the additional processes named. More explicitly, the linear relation given above conceivably may be replaced by

$$t_B + t_B^{\circ} - (t_A + t_A^{\circ}) = \frac{x_B + x_B^{\circ} - (x_A + x_A^{\circ})}{c - v}$$

and its companion relation (not given above), by

$$t_A' + t_A^{\circ\prime} - (t_B + t_B^{\circ}) = \frac{x_B + x_B^{\circ} - (x_A + x_A^{\circ})}{c + v}$$

these relations reducing to yours for a vacuum. Of course, a quadratic relation does not reduce to that of the special theory.

In summary, if

$$s^2 = r^2 - c^2t^2 + r_0^2 \quad . \quad . \quad . \quad . \quad . (A)$$

denote the “distance” squared separating two point events, then if $s^2 = 0$, the events might be termed “quadratically coincident.” I cannot find any term in the literature which conveys the meaning very well; in any case, some such alteration is suggested to replace the objectionable term in the ms.

Prof. Rainich expressed doubt as to the validity of eq. 1.12. However, I view the situation as analogous to that in which the quadratic form

$$s^2 = r^2 - c^2t^2$$

is invariant under the transformation compounded of a rotation in space and the identity in time; the Poisson equation is invariant under such a transformation. Similarly, the quadratic form given above (A) is invariant under the Lorentz transformation in $\underset{\sim}{r}$ and t, along with a rotation in $\{\underset{\sim}{r}_0\}$ space. The extended Poisson equation (eq. 1.33, p. 19) is invariant under rotations in both $\{\underset{\sim}{r}\}$ and $\{\underset{\sim}{r}_0\}$ spaces, with the identity in t and t_0.

The consequences of the discrepancy between observed and postulated states of motion are not sufficiently elaborated. Principally this was due to a reluctance to lengthen the paper beyond its present limits. It is my belief that the discrepancy results in the inertia characteristic of material systems, and, for that matter, gives significance to the quantity often referred to as the “mass” of a photon, $\hbar\omega/c^2$. Indeed, this appears to be an essential implication of Lorentz’ discussion (footnote 10 of the ms), in its present application. A similar condition is met in the observation of an impedance characteristic of electrical networks: due to the existence of a degree of freedom in addition to those explicitly in evidence (input and output voltages), there is a discrepancy between input and output voltages. For example, a dissipative impedance is considered to arise from electron-ion collisions, and an inductive impedance from storage of energy in an induced field. With reference to light signals, the additional processes give rise to the need for additional coordinates since it is agreed that light signals establish the metric.

The reduction of

$$p^2 + p_0^2 = \left(\frac{E}{c}\right)^2$$

to

$$p^2 + (mc)^2 = \left(E/c\right)^2$$

for a free particle is considered to hold strictly in a rest system alone. The second relation would seem to hold as well for energies sufficiently small that creation and annihilation of photons, electrons, etc. has a negligible influence on the motion. Similarly for the general relation 4.9, p. 36.

The introduction of the de Broglie hypothesis (p. 17) and the mixture of a classical and quantum mechanical orientations was not discussed as fully as might be. Thus the extended Maxwell equations are introduced (pp. 23-26) and these are followed by the extended Dirac equations. I felt that this was not an inconsistency since second quantization can be applied to both equations, while the equations of motion of quantum mechanics merge into those of classical mechanics at the macroscopic level. However, the motivation for the introduction of quantum mechanics lies in the necessity of averaging over many possible system states, and from one point of view these arise from fluctuations in a given state of a system. Such fluctuations are an integral part of the formalism proposed, even on a classical level, without the need for further introduction of state averages. I then am led to wonder whether or not there is need for the quantum mechanical orientation. This last is purely speculation: it seems to me that the essential deductions of a preliminary study would follow, whatever the orientation. The intent of the physical model seems sufficiently clear.

The relation

$$\psi_{\underset{\sim}{k},\omega,\underset{\sim}{x}} = \psi_{\underset{\sim}{k},\omega,-\underset{\sim}{x}}$$

is properly a vacuum condition. It is, however, employed as a condition on the creation and annihilation of electrons and positrons since these processes are usually described in terms of a weak interaction, and hence a small perturbation of the vacuum state.[17]

This is, of course, a proposal to replace the Dirac view of the nature of the positron with an alternate model.

It is noted that Bose-Einstein particles can contribute their effects to the relation 3.27. My interest at this point was in estimates alone and in obtaining Newton's law of gravitation, eq. 4.21.

With reference to Newton's law, the implication of the physical model is that the law holds only to a first approximation. Polarization of the virtual charges (of the effective gravitational charge) leads to gravitational mass renormalization. It is of interest to enquire as to the expected alteration of the orbit of the Earth's moon on this basis. The lunar orbit has been measured with great accuracy and it is known that Newton's law is not sufficient to account for observed anomalies.[18] It is my impression that the general theory of relativity predicts an effect of an order of magnitude insufficient to account for the discrepancies.

[Ed note. The following paragraph, it should be emphasized, references an early version of the UFT, and it is doubtful my father continued to hold this view of gravitation, as it never appears again in his papers. As I recall from numerous conversations over the years, his ideas on gravitation became fully focused in the mid-1970s, when he was brainstorming the meaning of the 1957 sighting referred to in Jim McCampbell's book, UFOLOGY, *(see p. 109). However, this is conjecture on my part*.]

A further consequence of the proposed theory is the alteration of a gravitational force near an intensely radioactive source. The change of sign of the inertial momentum for a positron (or for any anti-particle) is suggested to result in a reversal of the gravitational force for such particles in interaction with ordinary particles (e.g. electron, proton, etc.). I should like to raise the question as to the result of a positron screening of a nucleus in analogy to Coulomb screening of a nucleus by the electrons in inner orbits. If a radioactive nucleus which produces a space charge of positrons or anti-particle mesons could be found, would the gravitational force exerted on such material by the Earth be perceptibly altered? Again this is speculative to the point that I omitted any such proposal from the ms.

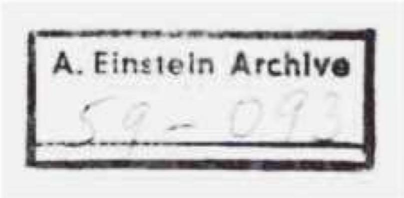
Prof. Rainich thought that there might be a possible equivalence of the nonlinear general theory of relativity, and the linear theory proposed. To date there has been no such comparison.

I regret that the demands of other duties have prevented the further development of the theory in any significant manner. May I express my admiration for the clarity and physical insight displayed in your papers, which I have read with keen enjoyment. Much of the inspiration for the ms sent you has been derived from a desire to emulate the classic simplicity of your expositions.

Sincerely,

F. E. Alzofon

F. E. Alzofon



[A. Einstein Archive stamp, 59-093; jpegs of letter provided by Barbara Wolff, Einstein Information Officer, Albert Einstein Archives, The Hebrew University of Jerusalem. See Acknowledgments]

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[17] *W. Heitler*, The Quantum Theory of Radiation *(Oxford University Press, 1944) second edition, p. 193*

[18] *H. N. Russell, R. S. Dugan, and J. Q. Stewart*, Astronomy *(Ginn and Co., 1926), Vol. I, p. 289. Compare also various works by Prof. E. W. Brown (references are not immediately available to me for quotation)*

Chapter 17

MILESTONE III, 1960

The Air Force Takes an Interest

AFTER THE MEETING WITH PROFESSOR FEYNMAN, my dad organized his entire life outside of work around one goal: writing a paper on gravitation. He chose to focus on gravitation because he thought that the theory might lead to a new propulsion technology that would open the door to cheap and easy space travel. This is what he told me in 1958 when I asked him what he was writing (I was eight years old at the time). In 1960, “The Origin of the Gravitational Field,” was published in *Advances in the Astronautical Sciences*.[19]

I well remember the disciplined daily routine that prevailed throughout the interim between his meeting with Feynman and publication of the paper. It began the moment he arrived home from Lockheed, Sunnyvale. He would give my mom a kiss and make a beeline for the back of the house, where he had converted a stucco-lined, linoleum-floored storage room built by the former owners into a “fortress of solitude.” It probably wasn’t up to code—the ceiling was low and it was often cold and drafty—but he had covered the walls with soundproofing and bookshelves, and it was quiet.

Minutes after arriving home, he would lock himself in this inner sanctum and the typing would begin. The “do not disturb” warning was a standing order and meant to be taken seriously. The clacking of typewriter keys ended only for dinner, which he shared with my mom while the children watched TV in the next room with the door closed. After dinner was over, he would retreat to the study, close the door, and continue writing until eleven. Once a week, he broke with routine to sit down with the family and watch *Perry Mason*. “Perry Masonite” was cause for celebration, especially for me and my siblings, though we were repeatedly admonished to sit quietly throughout the show. After it was over, it was understood that he would lock himself in the study again. The study was sacred. A parakeet we acquired during this era knew the routine as well as any of us. The first phrase it learned was “Shut the door!” which it would squawk with glee, over and over, as it fluttered around the house. This amused everyone, including my father, but the after-work and dinner rules didn’t soften.

Vacations, too, were just another opportunity for research. I remember my dad sitting on a beach chair by the campfire in Yosemite with a stack of physics books by his side, typing on a Royal portable, then rolling out the page and filling the gaps with equations written in jet black ink from a Parker fountain pen. In 1959, my mom gave me a recon assignment: I was supposed to ask my dad to write out his two most important equations. I found him sitting at his typewriter in the study. He was a little puzzled by my request, but complied. I remember him trying to explain the equations, which made no sense to me. It made no difference—I had gotten what my mom wanted. That weekend, she took me to a jewelry store where she got out the scrap of paper with the equations and explained to the jeweler that she wanted to engrave them on a pair of tie clips for his birthday.

The work rules never relaxed. They were in effect in 2000, when my dad arrived in Las Vegas for a vacation with a small library in tow. They were in force up until a month before his death in 2012.

The point of these anecdotes is not to elicit sympathy. My dad was distant, but my mom repeatedly told us that he was on an important mission, and we accepted his absence from everyday family affairs as normal. He wasn't averse to talking with us about his work on gravitation, either, even if relativity and the "creation and annihilation of charged particles on a subatomic plane" didn't make as much sense to me as the physics of two-wheeled bicycles, baseball, football, fishing, and dinosaurs.

"Gravity and antigravity," we understood even as children, were two words that summed up everything my father stood for as a scientist. About his work at Lockheed, we knew almost nothing. It was all classified and he never spoke about it. The atmosphere of Cold War secrecy made us feel as if the family was suspended on invisible threads, secure and insecure at the same time. *Appendix E, The Manhattan Project as Metaphor*, p. 355, delves into this topic further.

The reason I've painted a portrait of this period is simply to emphasize that his mission to conquer gravity was all-consuming, not only for him, but for the entire family, and more important, he was doing it all on his own. Lockheed had no idea what he was working on in his spare time and didn't care. Except for a couple of UC Extension courses on calculus he was teaching, his ties to academia had long since been dissolved. The few physicists he knew were not interested in unified field theory, especially *his* unified field theory. This is what made Feynman exceptional: He was a great scientist who had taken the trouble to listen, and had told him he might be on the track of something important, a simplification of physical theory (*see p. 93*). But the episode with Feynman was just that: an episode. There was no ongoing communication. The encouragement that Feynman gave, however, was enough to fuel an all-out effort that devoured every spare moment for decades.

In 1960, the theory of gravitation was published. Sixty percent of my life and one-hundred percent of my siblings' time on earth had been taken up in anticipation of that moment. We were all excited. When my dad showed me an article about the paper in the *Palo Alto Times*, a daily newspaper I delivered every day on a bicycle, I thought it meant that he would soon be emerging from his study to work on gravity and antigravity with other scientists. Surprisingly his paper drew attention, *not* from other scientists, but from the U.S. Air Force.

Were they inspired by a desire for cheap and easy access to space? Was it to recruit him for a secret program to back-engineer alien saucers? None of the above. The motivation was Cold War paranoia.

It seems that in 1960, a Russian physicist named Kirill Stanyukovich was boasting that the Soviet Union had an "antigravity propulsion system" that allowed the cosmonauts to get into space without rockets and maneuver like fighter jets once they were out there. Naturally, this raised eyebrows at the Pentagon, where embarrassment over Sputnik in the 1950s had not been forgotten. They wanted to know if Stanyukovich was telling the truth, so they hired Garbell Research Associates of San Francisco to investigate his claims.

The lead investigator, Dr. Maurice A. Garbell, decided to study gravitation research, not only in the Soviet Union, but everywhere in the world since the time of Newton. My father's freshly minted 1960 paper appeared just in time to be included in the survey.[20]

Garbell concluded that the Soviets were sending up a trial balloon to provoke the U.S. into admitting that *we* had such a technology. Perhaps the Kremlin was responding to rumors of reverse-engineering of the disks recovered in the Roswell crash.[21] Garbell concluded that the USSR did not have antigravity, nor did anyone else, and they were not likely to get it, because the general theory of relativity, which then, as now, was considered the gold-standard all over the world, offered no conceivable method for altering gravity.

One exception was noted: Alzofon's theory. The language in the report was encouraging but conservative. In a private conversation at a restaurant in Palo Alto (Stickney's, near Stanford stadium), however, Dr. Garbell said that the UFT was the only theory that he had looked at that "had a prayer of an engineering application." Garbell mentioned a possible avenue toward altering gravity in the report. My dad had already been thinking along the same lines,[22] but the favorable write-up offered him an excuse to approach the Pentagon. A meeting was arranged with the head of the Foreign Technology division at Ames Research Center just down the road from Lockheed at Moffett Field. My dad had worked at Ames in 1957 – 1958, at NACA, the precursor to NASA. Now he found himself sitting across the desk from the head of the Air Force's Foreign Technology Division, a full-bird colonel he had never met before.

"Well, Dr. Alzofon, quite frankly, when you called, I figured you were some kind of nut case. But I did some checking, and the Pentagon says that if anyone could figure out how to do this, it would be you, so why don't you tell me what you have in mind." (This is close to a verbatim quote of what my father told me soon after the meeting and several times over the following years.)

My dad launched into his pitch. The concept—an antigravity propulsion system—was extraordinary, but he couched it in the conservative language he had learned in the laboratory at Cal, with a lot of deferential "ifs" and "maybes." But with the Air Force's own report backing him and the imperative to get out in front of the U.S.S.R. in space technology, not to mention the lingering embarrassment of Sputnik, he thought he had a good shot at launching a research program.

The Colonel listened and then he said, “Research is all well and good, but what I want to know is, *can you make me something that flies?*”

“I have no idea,” my father said. Clearly, he had been laboring under the illusion that research programs are set up to *investigate* the unknown. Based on what research revealed, engineering goals would be determined. The Colonel said that regrettably the Air Force didn’t have the money to finance a fishing expedition. They could only justify investing in things that had a predetermined outcome and a delivery date, such as a project to build a better jet plane or a faster rocket. “Stanford’s right down the road,” he said. “Maybe they’d like to start something.”

Unfortunately, as Dr. Garbell observed in the conversation at Stickney’s, my dad’s theory would never be welcome at Stanford or any other university where general relativity set the boundaries for discussion *(see Chapter 27, p. 199)*. As Garbell put it, “A snowball would have a better chance in hell.”

The Colonel remained interested, however. He said he wanted to adopt my father’s program and keep it on the shelf until the money became available.

“Of course, a project of this sort would have to be classified higher than the Manhattan Project,” he added. “You might not even qualify for the clearance necessary to work on it.” The Colonel knew my dad already had a Top Secret clearance and had worked on many sensitive projects.

“Let me get this straight,” my dad said, his blood pressure spiking. “You want to ‘adopt’ my idea for a program that you can’t fund, and once you do that, I might not even be able to work on it?”

“That’s right,” the Colonel laughed.

“My *own theory*?”

“Well, I’ll see if I can get you authorization, but I can’t promise anything.” It was a moment straight out of *Catch-22* or *Dr. Strangelove*.

My father told the Colonel he wasn’t interested and walked out the door with the Colonel’s laughter echoing in the hall behind him. I remember the day he came home from that meeting, visibly shaken by the idea that his theory and the applied technology, which he had worked on for twenty years and intended for the use in the space program, might disappear down a black hole deeper than the Manhattan Project. He had gone into the meeting with high hopes and emerged in dread of losing everything.[23]

Nothing further came of the meeting, but it was a turning point in a couple of ways. First, the Colonel’s threat made a deep impression on my dad and influenced him to go public with the technology as quickly as possible in 1981. Contradictorily, it conditioned the paranoia and secrecy that surrounding the 1994 experiment. Last but not least, it was the first in what was to become an almost unbroken chain of disappointments that would span the next fifty-two years.

But the Colonel's all-important question: "Can you make me something that flies?" lingered on. The answer was not easy to find. It came thirteen years later, when my dad was puzzling over data gathered from a UFO sighting that occurred in 1957.

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19 *Vol. V, pp. 309-319, Plenum Press, New York, 1960*

20 "Soviet Research on Gravitation, an Analysis of Published Literature." AID Report 60-61, *Sponsored by Science and Technology Section, Air Information Division, Distributed by U.S. Department of Commerce, Business and Defense Services Administration, Office of Technical Services, Washington, D. C., October 1960. Available online. While I have seen the report, I do not have a copy of it. As I recall, it was dry reading and contained no revelations.*

21 *Most unimpeachable source:* The Day after Roswell, *by Col. Philip J. Corso and William Birnes, Pocket Books, 1997, ISBN: 0-671-03695-5*

22 *Though the devil was in the details, Garbell's report did forecast the solution that appeared in the 1981 paper.*

23 *See Appendix E, The Manhattan Project as Metaphor, p. 355*

Chapter 18

MILESTONE IV, 1973

A Key Sighting

MY DAD CONTINUED TO SPECULATE about an applied technology based on his theory of gravitation after the meeting at Ames Research. Since UFOs clearly manipulated gravity and inertia, he looked to them for clues, but the typical sighting offered little in the way of hard data.

In 1973, quite by accident, I discovered a book called *UFOLOGY—New Insights from Science and Common Sense* at Kepler's Books in Menlo Park. Kepler's was a location of some renown in the Bay Area as a center of the peace movement and parking-lot concerts by Joan Baez and the Grateful Dead. The author was James M. McCampbell, Northern California Chairman of the American Nuclear Society, a nuclear engineer who worked for Bechtel and NASA. McCampbell lived in Belmont, a short hop up the Peninsula from Menlo Park, and Kepler's Books was probably one of the few places in the world where his book was available.[24]

UFOLOGY was and *is* even now a landmark classic, the first book on UFOs to take a rational, scientific approach to the phenomenon. McCampbell wasted no time with the "Are they real or not?" debate.

In the introductory chapter, "Certified UFOs," he noted that decades of similar reports, radar echoes, photographs, films, and trace evidence from independent witnesses all over the globe made it safe to assume that UFOs were material craft. Then he analyzed the physical evidence in chapters with titles such as "Vehicle Design," "Composition and Luminosity," "Sounds," "Electrical Interference," "Physiological Effects," "Flight and Propulsion," and so forth. This was the kind of analysis my father had wanted to do, but had never had the time.

My eye was immediately drawn to a chapter called "Microwave Propulsion." Among other things, it had some remarkable observations stemming from a 1957 sighting aboard an Air Force B-47. This sounded like the kind of hard data my father had been craving, so I bought two copies of the book and forwarded one to him in Long Beach, where he was working for Rockwell International.

The incident occurred on a routine B-47 training flight over the Gulf of Mexico. The B-47 is familiar from Stanley Kubrick's classic, *Dr. Strangelove*. But delivering nuclear weapons was not its only mission. This particular flight was an electronic countermeasures training operation.

The pilot radioed in to report that a UFO "as big as a barn" with a "steady, red glow," was flying rings around the six-engine, turbojet-powered B-47, which was moving at speeds greater than 500 miles per hour (the top speed of a Boeing B-47 Stratojet is 608 mph). The sighting lasted more than one and a half hours while the B-47 flew across Mississippi, Louisiana, and northern Texas.

The B-47 had electronic monitoring equipment onboard, including an ALA-6DF passive receiver with back-to-back antennas spinning at a rate of 150 – 300 rpms in a housing on its belly. Incoming signals were displayed on an APR-9 radar receiver and fed into an ALA-5 pulse analyzer. The equipment showed that the UFO was emitting powerful bursts of microwave radiation in a very narrow range. The following summary was given by the Wing Intelligence Officer at Forbes Air Force base:

- Frequency: 2995 to 3000 Megacycles per second
- Pulse width: 2.0 microseconds
- Pulse repetition frequency: 600 cycles per second
- Sweep rate: 4 rpm
- Polarity: vertical

These figures are important, because they showed up again at the end of a series of equations my father used in preparing the 1981 paper and again in designing the 1994 experiment. In other words, he arrived at identical parameters for gravity-control technology by an independent route based solely on his unified field theory. This startling coincidence was the first of many. The correspondences between observations of UFOs and predictions of the UFT form a network of mutually reinforcing evidence, somewhat like a long, complex password to unlocking the secrets of alien technology.

McCampbell goes on to say, "The flood of microwave energy from the UFO was an essential, integral part of a propulsion system that is common to all UFOs."

But back to the year 1973: Here, in tantalizing form, was a major clue to what my father had been seeking since 1960. Microwaves played a role, but what was it exactly?

My father said that while he found the data intriguing, he wasn't sure what it all meant. Eventually I made contact with Jim McCampbell and introduced him to my father. The friendship lasted until Jim's death in 2008 *(see Chapter 30, p. 221)*. My dad agreed with McCampbell that microwaves were an essential part of the propulsion system, but it took another lucky break to fill in the missing piece of the puzzle and trigger that “Eureka” moment.

The second break occurred in the late 1970s. Prompted by his conversations with McCampbell and ceaseless contemplation of the data revealed in the 1957 Gulf of Mexico sighting, he was browsing the shelves of a technical library, “looking for a certain state of matter,” as he put it, when he stumbled across *Dynamic Nuclear Orientation*, a textbook by C. D. Jeffries (Interscience, John Wiley & Sons. N.Y. 1963). Something about the title immediately grabbed his attention and he took it down from the shelf. As soon as he fanned it open, he knew he had the answer he had been seeking.

“In principle,” my dad wrote, “the method of dynamic nuclear orientation is easy to state. A constant magnetic field is imposed on a specimen of a ferromagnetic material, causing the electrons of the atoms to precess about the direction of the field with a characteristic (Larmor) frequency. An oscillating magnetic field which varies at the Larmor frequency is then applied to the specimen at right angles, causing the electrons to tip over and become oriented. To preserve the angular momentum of the specimen, the nuclei must also tip over and become oriented.”

The “oscillating magnetic field” was supplied by square-wave pulses of microwave radiation in the vicinity of 3000 Mhz.

Suddenly the rationale for the alien propulsion system fell into place. The description is detailed in *Chapters 28*, *31*, *32*, and *pp. 253 – 259*, but in broad terms, rapid cycling of nuclear orientation drains energy from the gravitational field by forcing it to do work on disordering the ordered virtual process clouds surrounding subatomic particles (virtual processes involve the creation and annihilation of charged particles on a subatomic plane, with a net charge of zero; this is what makes orientation by means of an electromagnetic field possible). Rapidly cycling the order-disorder transformation acts like a pump to draw energy out of the gravitational force in the vicinity of the object whose nuclei are being oriented. A similar technique is used in cryogenic cooling (adiabatic demagnetization of paramagnetic salts). The difference, of course, is that the cryogenic process operates on a molecular level, but “gravity cooling” operates on a subatomic level.

One difficulty presented itself immediately: dynamic nuclear orientation as described in the text required cooling the specimen to the temperature of liquid helium. Obviously, UFOs were operating at higher temperatures than that, though there is evidence that they periodically take steps to supercool the hull, or they are forced to land when heating disrupts the gravity-control effect. However, he saw a way to overcome this problem using a “very pure isotope of aluminum,” which has a slow thermal decay time for nuclear orientation. Colloidal iron or chromium is added to the mix. The nuclei of these metals are easily oriented, but have a rapid thermal decay time.

The orientation of the iron or chromium molecules transfers to the aluminum by conservation of angular momentum.[25] This, too, was suggested by data from UFOs: Physical evidence had already been found to suggest that aluminum and colloidal iron particles are principle components in the hulls of the flying discs.

With Jeffries' book in hand, he ran some calculations. When he was finished, he found that his figures matched the data gathered by the B-47 over the Gulf of Mexico. This had to be more than coincidence.

The key had been turned in the lock, the tumblers had clicked, and a door had opened to a future beyond imagination.

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[24] *The first edition was self-published by Jaymac Company, Belmont. It was later picked up by another publisher and sold as a mass-market paperback. The entire text can now be found online.*

[25] *How does angular momentum transfer in a system with negligible mass, that is, a system under the influence of gravity control? In Chapter 31, p. 234, and elsewhere throughout the book, and in published works listed on p. 347, my father makes it clear that the agency is the* magnetic *moment: "We can imagine a procedure for lowering the energy density of the gravitational field (and therefore reducing its strength) by making use of magnetic moments."*

Chapter 19

MILESTONE V, 1981

Tesla Country

AS THE 17th JOINT PROPULSION CONFERENCE NEARED, my dad rushed to put the finishing touches on a massive paper on gravity control, rolling up his sleeves after a long day at Boeing and working evenings and weekends deep into the night. Nothing about his after-work routine had changed since the 1950s and 1960s, but now he lived in Seattle. In July, he scheduled a few vacation days, bought a plane ticket and paid for a hotel room in Colorado Springs with his own funds.

More than just a rationale for the device and the method of instrumentation, the paper included a weighty theoretical foundation aimed at justifying the UFT as an alternative to the general theory of relativity. This part of the paper was tailored for an audience of physics professors rather than the aerospace engineers and scientists who would be gathered at Colorado Springs. But, as is somehow common in publishing, a conspicuous blemish made its way onto the cover, in the form of the word “anti-gravity,” with a spelling borrowed from the British lexicon.

Years later, my father would say, “I didn’t know it at the time, but one mention of ‘antigravity’ and you’re sunk. Their eyebrows shoot up, they get a bemused grin on their face and that’s the end of it.” What ended, of course, was his claim to credibility. And, since the 1981 paper was to become his calling card in scientific circles for the rest of his life, the presence of “anti-gravity” in the title became a significant impediment to progress.

Prior to the Joint Propulsion Conference, my dad had retained the services of a patent attorney. By the time of the conference, the patent had been submitted and the term “pat. pending” appeared in the paper. This put his mind at ease about describing the technology in public. Nothing was left out: the paper included a modular circuit diagram and a complete theoretical foundation that would enable physicists and engineers to imagine new configurations for the propulsion system and calculate the specifications for a vehicle. None of this bothered my father in the least. Indeed, his whole strategy was to go public with gravity-control technology first, set off a stampede, and enjoy the show as humanity poured through the open door into space. He hoped that he would be able to head up an R&D program and hitch a ride on one of those spacecraft, too.

But humanity—or shall we say, the members of society empowered to do something—didn’t share his vision.

Initially, Boeing had requested that he put the company name on the cover of the paper. At the last minute, they withdrew their approval. But copies of the paper had already been printed and bound, so he spent the evening of his arrival sitting on the bed of his hotel room lining out “Boeing Aerospace” with a felt-tip marker on all the copies he had brought along with him. It was a somewhat comical gesture, since “Boeing” remained clearly visible.

Years later, there were rumors among UFO researchers that Boeing was working on “gravitic[26] propulsion,” and I always wondered whether my dad’s paper was the source of that rumor. If so, it was bitterly ironic, because Boeing wanted nothing to do with the 1981 paper, and *doubly* so because an investment of corporate pocket change would have put them at the forefront of gravity-control development and made the company untold billions of dollars—*in my humble opinion*, naturally.

The following day was the day of the presentation. He discovered that he was last on the program. By the time he stepped up to the podium—at 9 PM, as I recall—the hall was almost empty. Two hecklers sat side-by-side in the second row and began interrupting him, smirking and laughing during his opening statement. He invited them to explain what they found funny, and when they shrugged like schoolboys, he asked them if they knew anything about the Lamb-Retherford shift, and when they failed with some embarrassment, he asked whether they could define a light signal. Silence. They sat still and listened from then on. He always wondered whether or not they were CIA plants, since drunken hecklers would normally have left after being humiliated, but they sat through the entire talk.

I had always been optimistic that the Joint Propulsion Conference would be a turning point. After all, Colorado Springs was the home of Tesla’s legendary laboratory, an auspicious launch pad for a new technology, and the paper offered a complete recipe for a revolutionary new propulsion system that would put us—the U.S.—light years in front of any nation on earth in the exploration of space. How could NASA or the military-industrial complex resist? My father had an impeccable record of problem-solving for Lockheed, NASA, and Boeing, and he was still working in the aerospace industry. The 1960 meeting with the head of the Foreign Technology Division at Ames would have gone on his record, along with the Colonel’s favorable judgment. All it would have taken was an interdepartmental phone call, a summons from Washington, a nod from his employer.

But the call never came. Nor did the 1981 paper provoke any curiosity in the scientific community at home or abroad, where my father was more optimistic it would be well-received. Instead, the silence was deafening. There was no criticism, no compliments, not even a cough in the empty room. That’s not quite true: A couple of letters filtered in from graduate students in foreign countries who asked questions that revealed how little they had understood its message. The same thing happened in 2003 when a Silicon Valley friend, the late Richard Karpinski, made an effort to stir up some discussion of the UFT in physics forums. The comments were so ill-informed that my father refused to answer them. I had always thought that his message was clear enough, but as I read the comments I saw that the writers were anxious to superimpose their own knowledge of general relativity and quantum theory onto the UFT, at the expense of the latter. If they had expended half as much energy simply *reading* the text of the 1981 paper, or *The Unity of Nature*, his 1993 magnum opus on the UFT, they would have had all the answers they wanted and more.

For a while, my father rested and regrouped. Then he began writing and sending out proposals to nonprofit organizations. As noted above, he began to realize his error in using the word “antigravity” in the title and began using “gravity control” instead. Jim McCampbell was a friend by this time. As a former chairman of the American Nuclear Society in northern California, Jim suggested sending a proposal to the Department of Energy. He also offered to write a cover letter. We will close this chapter with the text of his letter, which was addressed to W. Kenneth Davis, Deputy Secretary, Department of Energy.

According to Wikipedia, Davis (1918 – 2005) was an American chemist, a leader of the World Energy Council, former vice president of the National Academy of Engineering, former U.S. Deputy Secretary of Energy, and director of reactor development in the Atomic Energy Commission. He was elected to the National Academy of Engineering in 1970 “for contributions to the development of nuclear power technology and its industrial application.” There is no indication of his response (if any). However, McCampbell’s confidence led my father to write the research proposal and submit it to the DoE.

I was unable to find a copy of the proposal among his papers, but there is no doubt that it was sent and returned after eliciting the usual lack of interest. The proposal was probably similar to *Chapter 35*.

It was, however, *copied* by the DoE. My dad put a microdot on the back of one of the pages and the microdot was gone on the page he received back. In other words, one or more photocopies had been made, and they had returned one of the photocopied pages to him by mistake. What it all means is anyone’s guess.

In 1981, I saw Colorado Springs as a propitious location to announce the discovery of gravity control because it was the site of Nikola Tesla’s renowned Experimental Station. In 1899, Tesla had said, “Progress in this field has given me fresh hope that I shall see the fulfillment of one of my fondest dreams; namely, the transmission of power from station to station without the employment of any connecting wires.”

If I had looked deeper into Tesla’s career *after* he left Colorado Springs in 1904, I might have been less sanguine about the future of the 1981 paper: Tesla packed up and left because he had run out of financing, and in spite of some astounding demonstrations, he never achieved his dream of worldwide wireless power transmission. Regrettably, his greatest invention was buried with him, as no-one has been able to replicate what he accomplished at the Experimental Station. As fate would have it, my father left Colorado Springs without making a splash, and in spite of an astounding demonstration of the technology in 1994, he, like Tesla, never lived to see the realization of his dream.

This book is predicated on the hope of ending the unfortunate parallels between my father's work and Tesla's. One hopes that we will soon see gravity control spreading around the globe like a wildfire, powering a new renaissance in the environment, the economy, space exploration, and expanding the frontiers of human consciousness.

A LETTER TO THE DoE

A scan of Jim McCampbell's letter appears on the following page. The letterhead was redacted to remove address and telephone number.

JAMES M. McCAMPBELL'S 1982 LETTER TO THE DoE

McCAMPBELL MARKETING COMPANY
Products for the home.

November 19, 1982

Mr. W. Kenneth Davis
Deputy Secretary
Department of Energy
Washington, D.C. 20585

Dear Ken,

Here is something that I feel justified in calling to your attention. A friend (Frederick E. Alzofon, MS Physics and PhD Math UC Berkeley) has developed a concept for influencing gravity. He proposes to experiment with currently available equipment that he will modify. His application for a patent reportedly has no interference. Enclosed is a copy ofa paper on his approach. It is unlikely that renowned scientists will recognize its value as it departs from tradition.

The reason that I think he may be on the right track is:

a) From theory alone, he derives the electromagnetic environment in which changes in gravity and inertia are predicted, and

b) Fifteen years of studying field observations of UFOs involving anti-gravitational and anti-inertial performance has independently led me to describe the same conditions.

Our government may have deciphered and duplicated the technology of UFOs. If so, the above is of no consequence. If not, Fred's work could be of critical significance. You can easily appreciate the range of implications. We have prepared a research plan requiring about a year and about $300,000. The next step is to obtain financial support. Meanwhile, Fred is proceding on a poor-boy effort that is promising.

I think that this matter deserves serious attention and wonder if DoE might have some interest. If deemed worthwhile, Fred and I would be pleased to meet with you or Department scientists in Washington or on the West Coast. We would waive any fees at this time but would request reimbursement of expenses.

With utmost respect,

Jamie

James M. McCampbell

This should not be passed around.

[26] *Surely one of the most egregious attempts at word coinage in the history of the English language.*

Chapter 20

MILESTONE VI, 1994

The Experiment

TEN MORE YEARS WERE LOST in sending out proposals and contacting investors. A pattern emerged: polite interest would be expressed, talks would follow, sometimes meetings. The prospective backers were always impressed. But when it came time to put money on the table, they would vanish, often saying, “Prove it out and get back to us.” The change in attitude often seemed to occur after the investor consulted with an expert in general relativity.

It was intensely frustrating to be working in Silicon Valley during this period, a world awash with investment capital, where endless talk of the future and “visionary technology” was heard in the coffee shops and brass-rail barrooms of Palo Alto, where investors risked millions on bonehead ideas with “sizzle,” but no-one could be found with the courage to back a revolutionary new technology with solid roots in known science and the potential to outstrip Microsoft or Apple in terms of profit and its impact on the economy and culture.

The reasons were many. As mentioned elsewhere, the term “anti-gravity” provoked suspicion. My father’s lack of clout played a part, as did the dismissiveness of “experts” who were consulted for a second opinion. Investors never seemed to be aware of the contradictions built into their pet phrase “Prove it out and get back to us.” Why would we need them at all if we were able to “prove it out”? Would we need them to swoop in and take the lion’s share of the profit perhaps? That seemed to be all they offered. The reality was that once my dad had proved it out, they would have been doomed to stand in line with hat in hand. But venture capitalists, as I learned, are not daredevil gamblers with bags of loot. Their capital is reserved for ventures with minimal risk.

Somehow, in the midst of this exasperating, repetitious exercise in futility, my father found a couple of allies who were not wealthy but were keen to take action. They were, in fact, much like the ideal audience envisioned for this book. One of them had a friend at a major university in Seattle who could give them access to a basement laboratory and most of the necessary equipment, especially the most expensive component: an electron paramagnetic resonance device used in assaying organic molecules *(see Figs. 6 and 7, pp. 323 – 324 for photographs)*. The missing components were procured for a modest price through various electronics and surplus stores in Seattle.

Once the decision had been made to go to work, the experiment came together with astonishing rapidity, which was curiously refreshing, especially after ten years of dithering by investors whose courage resembled that of a field mouse.

So finally, at long last, my father was doing what should have been done long ago, assembling the apparatus and advancing toward a denouement of sorts. As for me, I would know, one way or the other, whether or not his science-fiction dreams held any promise. As the date of the first experiment neared, I volunteered to fly up to Seattle and videotape the whole thing, as it might turn out to be "an historic event," as I told him. My father, however, wouldn't allow it. He gave me a number of excuses, but I think it came down to his fear that the government would raid the lab, arrest everyone, and shut him down. His fears were not entirely groundless (*see Chapter 17, p. 103, and Appendix E, p. 355*), but as it turned out, nothing happened, and the lack of photographic documentation turned out to be a grievous problem in the future, this book included.

Three rounds of experiments were conducted, on May 26th, June 17th, and June 18th. Afterward, my dad would say nothing until I signed a nondisclosure agreement. Once I signed the NDA, he said, "It worked the moment we threw the switch." He had little else to add until I came up to Oregon on a visit. Even then, I didn't see the experimental report contained in this book until 2001, the date of the postmark on the envelope he sent during my final campaign to find investors in Silicon Valley.

Though it was tempting to give the secret away to anyone who would listen, I kept to the terms of the NDA for twenty years, including two years after his death. Finally, the climate crisis and an overwhelming sense of frustration led to the decision to publish this book—against my better judgment. But when this invention might be the last hope of a doomed planet (if it works), what is there to fear, anyway? Then again, perhaps I've been misled by blind faith in my father's track record and a set of computer readouts. False hope isn't unusual or unheard of, but in this case there's reason to believe that these hopes are grounded in reality.

The report that begins on page 283 details the results of the experiment. The rest of this chapter will describe the unfortunate aftermath.

Within a few days after the experiments had been run, the Chemistry Department discovered that some expensive pieces of equipment had migrated from the laboratory on the second floor down to the basement, and they requested their immediate return. A decision was made among the conspirators not to inform the chair of the Chemistry Department that an earthshaking experiment had taken place in their basement. Instead, they decided to seek investors and reap the rewards.

There was only one small problem: *now there was no working device*. None of them had the $200,000 it would take to replace the EPR module, let alone the remainder of the borrowed equipment, so that meant assembling everything from scratch, which was too expensive without an investor, which now had to be someone willing to buy in *without* a demonstration.

Meanwhile, the money squabbles began.

One member of the trio, the electrical engineer, declared that under no circumstances would he ever work with the third member of the group again. The question of how to split the profits from any future ventures then became enormously complicated. The absence of the engineer crippled the effort to construct a new device.

Incidentally, I am not being coy about the names of the participants. My father mentioned them to me a few times in 1994, but after the group fell apart their names seemed unimportant, so I forgot them. They were not mentioned again, and when I received the written report in 2001, my father had whited out their names before making photocopies.

Like Sisyphus, my dad had rolled his boulder to the top of the hill, a task that had taken forty years, and now it had rolled all the way back down to the bottom again. His refusal to allow me to film the experiments and the absence of a working device meant that there was virtually nothing to show to potential investors other than a handful of poor-quality photographs and the computer readouts. When I told him I wanted to keep trying to find backing in Silicon Valley, he said okay, but I could not discuss the results of the experiment with anyone unless they signed an NDA. As I soon discovered, *no-one* would sign an NDA unless for a major corporation, so I was caught in a Catch-22.

The worst instance of the "NDA catch" came in 2000, when I returned to Silicon Valley to work with Jef Raskin on a new startup venture. Not long after my arrival, a mutual friend convinced Steve Jobs to call me and discuss backing my father's work.

I had met Steve a couple of times informally (once at Frankie Johnnie and Luigi Too! pizza in Mountain View right after Apple went public, and then at NeXT in 1990, where I was a contractor writing user documentation). He was also a frequent sight around Palo Alto. Jef Raskin had confided a few anecdotes about working with Jobs at Apple, but I would not even go so far as to call him an acquaintance. We did, however, grow up in similar neighborhoods in the Bay Area during the same era, and, given his reputation as a visionary, I was optimistic I could get through to him.

Almost immediately the conversation took a bad turn when he said, "What you're talking about is 'antigravity,' isn't it?" His tone of voice did not bode well. Then he asked the time-honored question, "If there was anything to your father's ideas, wouldn't Stanford have done something about it?" I have devoted all of *Chapter 27* to answering this question, so I won't go into it here, but I knew that the explanation would sound the wrong note and divert the whole conversation into the weeds.

What I wanted to do was cut immediately to the chase and say, "Stanford treated my dad the same way Hewlett-Packard treated *you*. So, like you, he went off and ran the experiment on his own, and it worked." But I couldn't *mention* the experiment without getting him to sign an NDA first, which was a ludicrous proposition, so the conversation led nowhere fast.

Everything was on the line at that moment, and even with a lifetime of preparation, I could not find the right words to grab Steve's interest enough to call my father. And, as fate would have it, I never had a chance to talk to him again. By late 2004, both Jef and Steve had pancreatic cancer.

Walter Isaacson's biography of Jobs was remarkably well-researched, but one story he missed was the reconciliation between Steve and Jef, who parted acrimoniously in 1982, when Jobs wrested the Macintosh project from Jef, who had created the concept of an information appliance, written the 400-page spec, hired the original development team, named the computer after his favorite Apple, and led the project for two and a half years, through the completion of the first motherboard.

In his biography, *Steve Jobs* (2011), Isaacson quotes Jobs as saying, "Raskin is a shithead who sucks" (p. 95). A *Time* magazine article quoted Jef opining that Jobs "would make an ideal king of France." In the twenty years I knew Jef, these were the harshest words I ever heard him say about his former boss. Though I wasn't there to see it, it's clear that they forged a friendship during the early days at Apple, and it was renewed when they met again at the cancer treatment center at USF in 2004. They remained friends until Jef's passing in February, 2005. Jobs died in October, 2011.

Is any of this germane? It is unlikely that I will have another chance to put this chapter of Silicon Valley history on the record. That's part of my motivation, but there's this, too (*next page):*

For a time, Silicon Valley inspired me like nothing before or since. It was a fiery cauldron of new ideas and noble dreams, *all of them based on electronics*.[27] And here, in my hot little hands, was an electronic device straight out of a geeky sci-fi freak's fever dream. It was the key to a *Star Wars* or a *Star Trek* future, capable of doing for transportation and space exploration what the personal computer had done for commerce and communication, and it had a Silicon Valley pedigree. By a strange coincidence, I knew two Silicon Valley visionaries capable of appreciating that analogy *and* turning the dream into a reality. Everything about it seemed foreordained. And then, at the very doorstep of the future, they both failed to get it, or perhaps I lacked the salesmanship to get through to them. Whatever the reason, they looked at the science with suspicion and, like the peer reviewers at the big-name journals, refused to listen further.

It will always seem a great tragedy to me that gravity control did not launch in Silicon Valley, its place of birth and natural home.

Over and over again in the quest for backing in the years 2000 to 2007, the lack of a working device arose as an insurmountable obstacle. That my father had it in hand in 1994 counted for nothing, because, like a UFO, it had floated off into the misty realm of "witness testimony," leaving aught behind but the report you see on pages 289 to 330. Even Hollywood, which was the last area I investigated before writing *How to Build a Flying Saucer*, insisted on "seeing something float" at the end of the show, which seemed like an interesting standard for a business dedicated to illusion, including *unreal* reality shows, CGI, science-fiction, flying saucers, and chasing UFOs (but never catching them). I must have asked myself ten thousand times what magic words would have broken through, not only to Jef and Steve, but to all of these potential backers. In a sense, this entire book is a last-ditch effort to answer that question.

The need for a working model, plus the unwillingness of investors to spend anything on its creation remained an unbreakable deadlock from 1994 onward. By 2005 my father said he was too old to lead a project and he wanted to dedicate his remaining time to writing papers on other topics. I pleaded with him to allow me to keep searching for investors, and he agreed as long as it was understood he would not leave home to guide the project. I widened the search to embrace show business and private space exploration companies, all the while seething because I knew that any average university chemistry lab had all the necessary equipment sitting on the shelf, and all the brainpower on hand to assemble it. The whole thing could have been done in six weeks, if anyone had a mind to do it.

In the end, it was all to no avail. Meanwhile, just as in *The Wizard of Oz,* the sands of the hourglass were running out.

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[27] *See* What the Dormouse Said, *by John Markoff, Penguin, 2005.*

Chapter 21

MILESTONE VII, 2012

Endgame

"I GUESS THERE ISN'T MUCH TO SAY."

These were the only words my dad could muster when I arrived at his hospital room in Corvallis in early December. It had been just two months since I had seen him, but the change in his appearance was shocking. What struck me most, however, were his words, or the lack of them. Though he was 93, he had always been fully lucid and ready to hold forth on all manner of subjects. Until just before the end, he had been working on an expansion of Sommerfeld's Method. And now he had only seven short words. Until I had spoken to his doctors and seen the X-rays of the tumor growing in his lung, I had held out hope that he *could* and *would* recover to continue his work. It was inconceivable that his body would quit before he had succeeded in repeating the 1994 experiment. But now I knew beyond a shadow of a doubt that his lifelong quest was coming to an end—an *unjust* end.

It will be difficult for the reader to grasp how my dad's all-consuming passion to unlock the secret of gravity and "antigravity" shaped the consciousness of our family. His quest may have been scientific, but it was comparable to a religion in the faith it inspired, a faith that my mother instilled in us from childhood on. The entire family believed that one day he would attain his goal and open the space frontier, and that this goal justified whatever sacrifices we might make. *Nothing* mattered more. The constant shadow of this quest had somehow made clocks stand still. Time could not advance until his theory had been proven or disproven. But of course time was advancing, whether or not I accepted it.

I had witnessed many ups and downs with the UFT and the applied technology over the decades since 1955, but I had never lost faith that in the end he would prevail. He was too good a scientist, he had solved every scientific problem he had ever tackled, and the 1994 experiment strongly suggested that his theory was more than a blackboard dream.

The pattern of his research was well established. First came the riddle, then the theory, then the doubters, then vindication, over and over. It had gotten so familiar that whenever the world said he was wrong about something, I took it as a reliable indication that he would soon be proven right. For example, the pattern had held when his experiments with infrared in the 1960s had vindicated his theory about the viability of thermography. It held when he had shown that the Sommerfeld method was extendable to objects of arbitrary shape. It held when he used optical methods to describe heat conduction in solids. And it held when he had described the physical origins of turbulence in the language of mathematics.

But now, at the end of his life's journey, he had nothing to say about his central quest, which, like the others had been successful, but *unlike* the others had gone completely unrecognized. Nor did he have anything to say about what must have been his monumental sense of frustration with academia, government, and private industry. He had nothing to say about what *might have been* if anyone—any department chair, any bureaucrat, any "visionary" billionaire—*anyone at all*—had understood the implications of the theory or the technology and had done something about it.

The planet might have been saved. We might have joked about it once in a while, but it was always tacitly understood that these were the stakes. Nothing more, nothing less.

And what now? No final advice about what to do about his technology once he was gone. He just wanted to go home and rest. "Forever," as he said.

I had taken a flight up to Portland, but after he died, I decided not to fly back. Instead I bought a train ticket at Albany, about twenty miles north of Corvallis, and rode to Los Angeles. It would give me twenty-nine hours of clacking railroad tracks, jostling passenger cars, and fitful sleep in a resolutely upright seat to absorb the catastrophic sense of loss and decide what must be done. Because there was no doubt in my mind that it was not over.

By the time I got out at Union Station in Los Angeles, I had concluded that it would be best to continue to do things *his* way, but with one small change: I would lift the veil of secrecy on the 1994 experiments.

As 2013 began, I started writing a proposal that included a description of the 1994 experiment, concentrating on the results, but omitting the nuts-and-bolts details. What physics department could resist the temptation of an easy Nobel Prize and a place in science history using nothing more than off-the-shelf equipment? In short order, we would be standing the world on its head.

Or so I thought.

Writing the proposal took seven months, and it was a waste of time. Not one of the six or so universities I wrote to, including my father's alma mater (as well as mine), the University of California, would consider it. They didn't "reject" it—rather, they refused to acknowledge it. It was just as Dr. Garbell had predicted in 1960: A snowball had a better chance in hell than the UFT had in a university. As for the idea of altering gravity, one did not even *suggest* such a thing at that level. No reason was ever given, nor was there any curiosity over the experiment. A non-Einsteinian view, let alone "antigravity," was simply beneath consideration. Past experience led me to believe that the source of the proposal (a nonacademic) alone was enough to preclude consideration.

Meanwhile, every day brought more news indicating that the pace of climate change was accelerating, which lent an air of desperation to the search.

When I realized that I would never get anywhere knocking on doors at the university, I decided to revisit private industry. I contacted, or attempted to contact, all of the companies engaged in privately funded space exploration, several of which were in my backyard in southern California. It was exactly the same: no response—not favorable, not unfavorable, but *no* response at all.

It was astonishing to find that lifting the veil of secrecy, something my father had feared would generate a cold-fusion-like fiasco, had no effect whatsoever. One professor—a talkative chap compared to his peers—was kind enough to send back the proposal and assure me that the university would do no work on my father's technology. I was grateful to know that there was, contrary to all other indications, a human being out there, but I could almost feel the touch of kid gloves reserved for the lunatic fringe. Beyond frustrating, it was terribly sad.

Writing letters, sending proposals, and waiting for responses had been enormously time-consuming. After three years, I was running out of options. In the second half of 2015, a new idea came to me: *Hollywood*. If everyone thought my father's invention was fantasy or science-fiction, fine—I would pitch it to people who loved fantasy and science-fiction. At least their publication standards would be less stringent than a scientific journal.

In 2005, I had stopped in at a magic shop in San Francisco and had an inspiring conversation with the owner, who encouraged me to contact big-name magicians with the idea of allowing them to perform *real* magic onstage. After all, what if a magician could toss an SUV like a football, or make members of the audience float, with no strings or wires attached? After two years, nothing had come of these efforts because direct talks were impossible to arrange. The people I needed to reach were as remote as royalty, surrounded by walls and fences and flappers whose whole mission in life was to prevent people like me from talking to them directly. Since the subject matter required some discretion and background explanation, it was far too difficult to penetrate the castle wall. The whole experience left a bad taste in my mouth and that had kept Hollywood far from my mind.

One night in 2015, however, I was watching a late-night program about UFOs, and as I listened to a couple of well-meaning scientists awkwardly attempt to interpret UFO flight with the limited tools at their disposal, a light switched on. Perhaps instead of *chasing* UFOs, Hollywood would like to *catch* one? If I could get just get one cable-TV documentary on the air, I thought, controversy would begin to swirl, and I would follow up with a book such as the one you're holding, that is, with a complete guide to building a flying saucer. It shouldn't be too difficult, should it? After all, if the Kardashians could generate millions of dollars, surely it would be a snap to sell something as awesome as a solution to the UFO enigma and a plan to save the planet. Much of the content envisioned appears in the *Milestone* chapters and *Chapter 24, The Top-Ten UFO Riddles (pp. 147 - 186)*.

The Hollywood campaign continued through the rest of 2015. The first company I contacted had produced several made-for-cable documentaries about UFOs. I received the modern corporate response, which is to say, *no* response at all—just like the universities and the space exploration companies. Roughly ten other carefully vetted contacts followed. My only form of contact was formulaic rejections by email. I was ready to give up when, much to my surprise, I received an enthusiastic response: “We want to do your show.” I replied by thanking them and suggesting we meet and discuss—and never heard from them again. No reason given.

It was at that point that I gave up on Hollywood, not because I was discouraged, but because I was damned sick of hemorrhaging time. Hollywood is home to some of the smartest people on earth, but the subject matter of *How to Build a Flying Saucer* isn’t something that easily reduces to a log line and a ninety-second pitch, even if it does feature perennial favorites, such as flying saucers, aliens, a maverick scientific genius, and a plan to save the planet. If they didn’t get *that*, what was the point?

Now I was faced with the grim fact that four years had gone by since 2012—four years of knocking on doors, making calls, writing letters and proposals, and sending packages. I was *out of time*, and so was the world, with its bovine indifference, blind ignorance, and institutional paralysis. Fortunately, there was a way out. Print-on-demand technology made it possible to shift into four-wheel drive, pull around the gatekeepers, and ride by in a cloud of dust with middle finger held on high. Just thinking about it gave me the refreshing sensation of having the wind at my back for a change.

A self-published book was the only alternative that made sense. A book proposal would have taken six months to write, above and beyond the book itself, and then it would hit the desk of a New York publisher, where, if it wasn’t dismissed immediately for one reason or another, it would have been referred to an “expert,” with the same tiresome result *(see p. 199)*. The manuscript might have been *approved*, of course, but the low probability of success, coupled with the time loss and the accompanying risks, was simply too much to bear. Print-on-demand guaranteed publication, at least.

Once the book was an accomplished fact, even on the modest scale a self-published work, perhaps it would draw enough attention to trigger alarms in the halls of the institutions that had ignored all the formal, dignified entreaties over the last fifty years.

But here’s the cool thing: If the book had no effect whatsoever on those hallowed institutions, there were still plenty of people *outside* the castle walls with the knowhow to repeat the 1994 experiment. At the risk of repeating myself *ad nauseum*, any EE with the knowledge required to design a microwave oven could do it.

It was my last dollar and I was dropping it in the last slot machine on my way out the door of the biggest casino on earth. So here we stand—amid the din and the clamor, the bells, the smoke, the high rollers and the hoi polloi—waiting for the last reel to stop spinning on the last bet on the last slot machine in the world that might have a chance of hitting the jackpot and saving the planet.

Tick-tock.

PART V

Odds and Aliens

It is unnatural in a large field to have only one shaft of wheat, and in the infinite Universe only one living world.

— Metrodorus of Chios, Presocratic philosopher

Chapter 22

THE (GRAY) ELEPHANT IN THE ROOM

IF IT HAD BEEN POSSIBLE to leave the topic of aliens out of this book entirely, I would have been more than happy to do so. Like curry or clove, the addition of "aliens" to a recipe overwhelms all other ingredients. A simple search on my father's name, however, would have disclosed that he had written a couple of articles on UFO propulsion for the *MUFON Journal* (*Appendix C, p. 347, Refs. 3, 8*), and a closer inspection would have revealed that he was a consultant on UFO propulsion for the same organization at one time.

Even though MUFON is a respected group dedicated to scientific study of the UFO phenomenon, had I pretended that UFOs weren't part of the narrative, it would have given skeptics fuel for criticism. It would also have made it difficult to cite my father's July 2004 article for the *MUFON Journal*, "UFOs and Crop Circles: Gravitational Field Common to Both," which is one of his best, and, thanks to the Disclosure Project, can be read online, at least at the time of this publication (*see p. 349*).

If UFOs make you uncomfortable, you're not alone. But take a moment to think back and identify when and where your attitude began to form. Perhaps it stems in part from the constant barrage of propaganda directed at "UFO believers" ever since the Roswell crash in 1947, a relentless campaign of ridicule and scoffing which has led to the pro forma smirk displayed by news anchors whenever they read a UFO story on-air. Sci-fi movies that portray aliens as fiendish monsters don't help, and neither does the image of the "UFO believer" as a fevered fanatic in a tinfoil hat.

Thanks to the efforts of opinion-makers such as Steven Spielberg and Dr. Steven Greer, however, the image of "UFO believers" has improved somewhat. In addition to ordinary folk who report seeing something strange in the sky, the ranks now include numerous individuals in positions of trust and authority, such as police officers, commercial and military pilots, and even a few scientists who've gone out on a limb to admit, "We can't identify whatever's in this photograph." But, thanks to decades of propaganda from authority figures with an ax to grind, the stereotypes die hard.

We must also give the propagandists credit: they've stepped up their game since the 1950s, when Air Force personnel were shown tossing around a garbage can lid and mockingly comparing it to a flying saucer. But today's P.R. campaign still has the same three goals: anesthetizing public concern, attaching a social stigma to witnesses, and arousing fear. Ironically, witnesses are often called "attention seekers," when most of the attention they receive is negative, and they risk their careers and relationships by coming forward. This is even *more* true for scientists than, say, bus drivers, which makes scientific investigation of the phenomenon all the more problematic.

Social forces are powerful allies when you need to sell a lie. Marshalling them is inexpensive, too—all that's required is one authority figure to issue bland denials and another who specializes in ridicule and whose specious arguments can be labeled "scientific" without a challenge from another scientist. From the viewpoint of those whose goal is to shape public opinion, there are good motives for this tactic. As for you and me, the beneficiaries of their messaging, we can take dubious comfort in the knowledge that it's all for our own good.

Sadly, seventy years after Roswell, you *still* can't handle the truth.

One need not invoke a dark conspiracy to explain this behavior. In the Middle Ages, records suggest that UFOs were landing in fields and giving peasants rides into space. *Peasants, yet! Why, if these spaceships were real, they'd land on the castle lawn and take* the King *for a ride! Those spaceships are undermining royal authority!* The necessity for preserving the social order prompted the monarch to decree a beheading for anyone who mentioned the aliens.

Tactics toward the peasants are less brutal these days, which might be read as a sign of progress. Or is it? For example, it was impossible to mention UFOs in any of the proposals I submitted to universities or private space exploration companies contacted after my father died in 2012. No matter how rational my approach might have been, the merest scent of UFOs would have been enough to kill any chance of serious discussion. And yet a quick Google search on my father's name would have brought it up instantly and made it look as if I were trying to conceal something. *Catch-22*.

My father used to say, "When we get our own flying saucers, then it will be all right for the aliens to have them, too." It is my hope that this book will bring this rebalancing about. Those in authority will find it difficult to deny the existence of UFOs when the peasants are taking test drives in their own saucers, made in Detroit and advertised during the Super Bowl. Photos and videos can be faked, but public demonstrations of an authentic gravity-control propulsion system are another matter. The ruling elite may feel their power threatened briefly, but not for long: Unlike in the Middle Ages, there's a saving grace: *a hell of a lot of money will be made on gravity control*, and, as always, the ruling elite are the ones in the best position to make it.

Regardless how you learned about UFOs, I sympathize if the subject makes you queasy, because that's the way I felt when I was introduced to it in 1957, at the age of seven. I was sitting on the floor of my father's study, pulling sci-fi magazines off the shelves and reading the stories or looking at the cover art, which featured sexy babes in skimpy spacesuits being rescued from weird looking aliens by square-jawed spacemen wielding ray guns. Meanwhile, my dad sat in a creaky office chair and tapped away on a manual typewriter, pausing frequently to roll the platen half a line up or down for superscript and subscript numerals in equations. *Click-click, ker-*

chunk, and repeat.

It was a cramped little room that had served as a kennel for dachshunds before we moved in. My dad had cleared it out and cleaned it up, carpeted the cement floor, covered the walls with bookcases and soundproofed the door so he had a place to retreat from the world and write. By "the world" I mean me and my siblings, who were admittedly a rather noisy and distracting gang of four. In all likelihood he was working on his first paper on gravitation on the day in question, and I was under orders to keep quiet if I wanted to stay in the room.

My random foraging on the bookshelves eventually led to the discovery of two drab, rough, paperback government documents completely unlike the slick and colorful sci-fi magazines on either side of them. The first was a report on nuclear testing by the Atomic Energy Commission. It was filled with black-and-white photos of mushroom clouds and bomb sites, from the Nevada desert to the Bikini Atoll. My mom had worked on the Manhattan Project, and that may have been the origin of the book *(see p. 355)*, though more likely it was something my father collected on his way through aerospace. The second was called *Project Blue Book*, the Air Force-commissioned report on UFOs. This was undoubtedly something my dad had picked up, though I have no idea where. It was certainly not something you would find in a bookstore, and nothing like it is for sale online today.

Inside, amid all the tedious verbiage, were a few wretched drawings of spaceships. But it dawned on me that these were not just amateur copies of sci-fi magazine covers—these were sketches of presumably real spaceships seen here on earth. This was a puzzling and exciting revelation. Then I came to the famous McMinnville photographs taken in 1950 by Oregon farmer Robert Trent. Here were clear, daylight photos of a flying saucer, and the Air Force admitted that they had no explanation for them. Didn't one exception disprove a theory? If you added two and two and got *five* every once in a while, wasn't that enough to disprove the "two plus two equals four" theory?

But there wasn't just *one* exception. The book said there were over seven hundred. Yet the study concluded by saying, "There was no evidence... indicating that sightings categorized as 'unidentified' were extraterrestrial vehicles."

Considering that there were over seven hundred reports of alien spacecraft that defied explanation, this blandly stated conclusion struck my childish brain as more than a little contradictory. If I looked out my window and saw *seven hundred* gopher holes in the lawn, by what twisted logic would this lead me to conclude that I *did not* have a gopher problem? I mean, it's like the wife who finds her husband in bed with another woman, and he says, "Who are you going to believe, honey—*me* or your own lying eyes?" That sort of reasoning seemed to be characteristic of Project Blue Book, which was offered to the public as the definitive word on flying saucers.

On the other hand, the whole idea that earth was being visited by extraterrestrials was as disturbing as it was fascinating, so I decided to risk interrupting my dad and appeal to him for some clarity, of which he was never in any short supply.

"What do you think about this?" I asked. "They say there's over seven hundred cases they can't explain, but there's no such thing as flying saucers. I don't get it."

"It's a public relations campaign," he said. "They want to stop people from asking too many questions. That's all."

"So there really *are* flying saucers?"

"So it seems," he replied. Since he was a virtual walking encyclopedia and had the answer to every scientific question I had ever asked him, I had to believe him. And in case you are wondering, I am *quite* certain that his work had nothing to do with UFOs, since all of the books and papers he brought home had to do with infrared optics, and he had no contact with the people, places, or agencies allegedly involved in reverse engineering alien technology. More than that, it would have been impossible for him to keep that kind of secret forever. It would undoubtedly have influenced even small talk he had with us and others about UFOs, and it never did.

As a result of this conversation with my dad and a plethora of "unexplained sightings," I concluded that the "Real or not?" question was a bone thrown to the public to keep them chewing on irrelevancies. Nothing has arisen in the intervening years to disabuse me of this notion. Apparently, it's a pretty interesting bone, too, because there are still cable TV programs dedicated to gnawing on it week after week before arriving at the painfully predictable conclusion that—dang, wouldn't you know it—there wasn't any bone there after all. Even now, in 2016, *X-Files* returned for a second run on the theme of "We must ask ourselves: 'Are we truly alone, or are we being lied to?'" It is astounding to me that this state of affairs prevails today, when a second-grader could see the answer in 1957.

Since many of the skeptics in the audience are the technically skilled people we need to keep onboard through the scientific part of the story, I would like to reassure them that they need not become an overnight Fox Mulder: temporary suspension of disbelief is quite enough. It is impossible to leave UFOs out of the discussion, because the flight characteristics of UFOs—as reported by experienced pilots, law enforcement officers, military personnel and other reliable witnesses, as well as recorded on video and seen on radar—make up a significant body of corroborating evidence for gravity-control technology, and vice versa. That is, the predicted characteristics of the technology explain much about UFOs that has been confounding and mysterious until now. Finally, my father's insight into the technology was triggered by a UFO sighting documented by the U.S. Air Force (*see p. 109*).

Thanks to NASA, suspension of disbelief is a little easier today than in the 1960s, when we knew comparatively little about deep space. At the time, not a single planet outside the solar system had been found, nor did we ever expect to find one. Today, the Kepler Space Telescope has identified more than 1,000 exoplanets (planets circling other suns), and at least one of them, Kepler-452b, is earthlike, with an average surface temperature of 72 degrees Fahrenheit. By the time this book goes to press, there will probably be a dozen others.[28]

With 100 billion stars in the Milky Way, and billions of galaxies in the known universe, the probability of a technological civilization arising elsewhere isn't as remote as we used to think. And if that civilization exists, it's probably much older than ours, given that we are a relatively young world on the fringes of the Milky Way. The stars toward the center of the galaxy are much older than our sun.

That leaves the problem of crossing interstellar distances. That, too, may not be quite the barrier that it seems. I know that my father—who earned a standing ovation for his lecture on special relativity and the speed of light before the American Association of Physics Teacher in Guelph, Canada, in 2003—believed that it was an apparent barrier, not an actual one. The question is how to achieve it, and how to avoid being destroyed by collisions with particles, dust, or space debris en route, and how to slow down on approach to the destination. If my father had any idea how to overcome these problems, he never said anything about it, other than that he thought the force of gravity itself might be useful. If one were to increase the gravitational pull in the direction one was moving and decrease it on the opposite side of the ship, there would be no limit to the speeds obtainable.

While the aliens must have faster-than-light propulsion technology, it seems to be based on a principle that is beyond our comprehension at present. Gravity control is useful for getting on and off the planet and maneuvering around the solar system, but faster-than-light travel must await further developments. I did ask my dad what it would look like from the pilot's point of view, and he said the stars in front would turn a little bluer and those behind would turn a little redder, but that was all. No swirling worm holes or smearing of stars, *Star Wars*-style.

If your disbelief is temporarily on hold, perhaps we can conjecture about what the aliens might do if we were to start buzzing around the solar system in flying saucers of our own.

Some readers might be concerned that the sight of earthlings in saucers would provoke them somehow. Fears like this seem to be a projection of human inclinations on beings we know next to nothing about, except for one thing: They've consistently gone to extraordinary lengths to avoid clashing with us.

The famed "Battle of Los Angeles" in 1942 is a prime example. Three months after Pearl Harbor, a large flying saucer drifted over Los Angeles at 3:12 AM. Eyewitnesses described it as a 100-foot disc with a dome on top.

Los Angeles greeted the interloper with air raid sirens and an artillery barrage. The city went black and thousands of air raid wardens assumed their posts. The saucer, which was traveling at a low altitude and a leisurely rate of speed, something like a blimp (it took over half an hour to cover 25 miles), was lit up in a net of spotlights, and the 37th Coast Artillery Brigade began firing .50-caliber machine guns and 12.8-pound anti-aircraft shells. The shells exploded harmlessly in a ring around the craft Over 1,400 rounds were eventually fired before the saucer drifted out of sight at 4:15 AM.

Next day, the newspapers featured photographs of the disc lit up by spotlights with shells exploding all around (Google “Battle of Los Angeles 1942 images”). Shell fragments damaged vehicles and buildings, three people were killed in car accidents, and two died of heart attacks. The aliens, however, never returned fire.

A day later, the military stepped up with their standard “weather balloon” explanation (which at the time was not yet standard), but the question remains: How could a weather balloon get on the wrong end of over 1,400 rounds of explosive armament without being vaporized? A more recent debunking attempt labeled the object a “cloud.” This overcomes problems with the “weather balloon” explanation, but the similarity between a cloud lit up by spotlights and the 1942 object is superficial at best.

Well, “Move along, move along—nothing to see here.” Skeptics will find a weather balloon, a cloud, the planet Venus, or swamp gas at the bottom of things no matter *what* evidence is presented, but this very public case was well-documented by photographs and news accounts, and there can be little doubt about the object illuminated in the converging spotlights: a classic flying saucer. And the point worth repeating is this: The aliens, if any, ignored the invitation to hostilities. The “battle” was one-sided.

Even when military aircraft have scrambled to take out UFOs with air-to-air missiles, the aliens haven’t shot back. They’ve either made a rapid exit or disabled the onboard electronics of the attacking planes as soon as they detected radar lock-on.

Rather than cite the better-known, but by now boring examples, such as the Iranian jet that was incapacitated when it locked onto a UFO over Tehran on September 19th, 1976, I will relate an incident that occurred near the Naval Air Weapons Station at China Lake, California. As far as I know, this story has never been published before. While I heard the story from a witness and did not experience it myself, it bears the familiar earmarks of a typical encounter between the military and a nosy UFO. It was this story that inspired the cover art for the book.

In the early 1970s, the witness was returning to Los Angeles from Nevada in clear, sunny weather around midday when he drove over a hill and beheld a panoramic view of the eastern Sierra in the distance. The highway led straight on for miles across a dry lake bed, but the most arresting sight was dead ahead: a classic flying saucer, which they estimated was 300 feet in diameter, hovering directly over the asphalt and wobbling wildly on its axis, as if about to crash. Drivers on either side of the disc had come to a halt, partly because the rim of the saucer was on the verge of scraping the pavement. Suddenly, it stopped gyrating, froze up, and hovered silently while rotating slowly, as if poised and listening for something in the distance. Then, with blinding speed, it darted across the flat desert to the north and arced up into the sky (*UFO Riddles #2* and *#3* discuss this sequence in some detail, but you might want to save them for later). Moments later, two fighter jets screamed across the highway at low altitude in hot pursuit. But the pursuit was pointless—the saucer had vanished from sight.

The behavior of the China Lake saucer seems fairly routine for UFOs trespassing in military air space: they flee as soon as they detect jets scrambling to meet them.

When one considers the level of technology necessary to accomplish a feat such as this, humanity's discovery of how to build a rudimentary flying saucer pales by comparison. If the aliens had hostile intentions, they have certainly had the means to carry them out all along, yet they haven't shown aggression in any way other than, say, an aikido master deflecting the wild blows of a barroom brawler.

What about the "White House lawn" question? Having had a few discussions like this in the past, I'm sure that someone out there is wondering why the aliens would cross trillions of miles of space and fail to shake hands with President Trump and share their advanced technology with us.

Like you, I'm sure, I find that baffling. But let's look at it from their point of view: *What would they have to gain? What would be the follow-up? What would be the consequences—on both sides? Might they know that it would do more harm than good?* Perhaps they are familiar with hundreds of worlds with intelligent life, and perhaps humanity isn't quite as irresistible a species as we imagine ourselves to be. From the vantage point of beings who have long since mastered the art of traveling between the stars and engineering their own evolution, we may be more interesting when observed from a distance, much as we might observe an ant colony. Perhaps we are, to put it in kindly terms, *primitive*.

Speculating about alien motives is ultimately an exercise in futility. Fortunately, this is a book about building a flying saucer, and it is completely unnecessary to understand the psychology of those who built saucers before us. Nonetheless, I will close out this chapter with an anecdote that illustrates the trend of my own thinking. Again, this is sheer speculation and I will be happy to abandon it as soon as more reliable information becomes available.

My uncle, Dr. James R. Wilson, was an astrophysicist, a legendary mountain climber, and a man of very few words. He worked at the Lawrence Livermore National Laboratory and the Vatican Observatory. We never talked about extraterrestrial life or whether he had seen a UFO while trekking in the Sierra wilderness or while peering through the lens of a telescope, but I do remember a magnificent treehouse he built high up in the branches of an old oak tree in his backyard.

While visiting Jim's home in Livermore, California, when I was about eight years old, I discovered the treehouse and instantly had a burning desire to climb up and take a look around. The only way up, however, was a rope ladder, which was a bristly manila rope about two inches thick and eight feet long that dangled from a hatch in the bottom of the treehouse—no knots, no steps, no *nothing*.

I told Jim I wanted to see the inside of the treehouse. I felt my desire was justification enough, but Jim crossed his arms and said that I could see the treehouse when I could climb the rope.

“Can’t you just give me a ladder?” I said. Jim had already made us practice rappelling down the side of the house to prepare for the possibility of a fire and I had already decided I didn’t like rope climbing.

“Children who can’t climb the rope, can’t use the treehouse,” he said. He was smiling, but his gruff tone left no room for argument. Jim’s oft-repeated motto was “Suffering is joy supreme,” even for kids, I had learned—*especially* for kids—so I knew he was serious. What else could I do but take hold of the rope and try. The stiff fibers cut into my palms. I grabbed harder, kicked my legs up off the ground, and attempted to shinny up the rope, but my arms weren’t strong enough. After hanging in place and swaying back and forth a few times, I had to let go. Jim was still smiling when my feet hit the dusty ground with the dull thud of defeat.

“Come on, *please* give me a ladder,” I pleaded. It didn’t seem fair.

Jim didn’t answer. He just turned and walked away, leaving me on the edge of tears. Try as I might, I never did get to see the inside of that treehouse.

From what I’ve been able to glean from the apocryphal lore of alien contact, it seems that they are playing a game of rope ladder with us. Merely launching satellites into orbit or unmanned probes to Mars, as impressive as these achievements may be to *us*, still aren’t enough to get us into the treehouse. They may be awaiting signs of social maturity on our part, and gravity control, I suspect, would be enough to tip the balance, because it means easy access to space and interplanetary travel for *millions* of people, not just a few, and this would prove that the human race had freed itself from the limitations of an earthbound existence, and presumably, the earthbound consciousness that goes with it. In other words, attaining gravity control under our own steam—no ladders provided—would signal our graduation from rug rats to toddlers in the cosmic scale of development.

The game of rope ladder would explain the phenomenon of crop circles, for one thing. For once, let’s not get distracted with the debate over whether or not crop circles are alien in origin. Certainly there have been some pathetic attempts to mimic them, but the real thing is too numerous, too grand in scale, too intricate in design, too replete with unique earmarks, such as exploded stem nodules, to be the work of human beings—or hoaxsters like Doug and Dave, as the case may be.

Various attempts have been made to decode the hidden messages in crop circles, but my dad always felt that the medium *itself* was the message. In the aforementioned July 2004 issue of the *MUFON Journal*, he proposed that the same technology used in UFO propulsion was responsible for making crop circles. Like the rest of this book, this hypothesis can be verified by experiment; the experiment simply hasn’t been done yet.

In conversations over the dinner table he used to tell me that crop circles may represent a last-ditch effort to slap us in the face with so many clues to gravity control that the answer would finally dawn on even the most hidebound of earthly physicists. Remember the two rules of the game: “No ladders,” and “Children who can’t climb the rope, can’t use the treehouse.” It strikes me that crop circles may be the work of sympathetic aliens who want us to climb the rope and know we are close to being able to do it, but they are bound by the rules not to provide a direct solution, so they offer clue upon clue upon clue to help us get across the threshold.

So far, we’ve flunked. But if this book has the desired effect, things may change.

If you’re a *Star Trek* fan, you know that Zefram Cochrane’s first warp flight brought about contact with the Vulcan starship T’Plana-Hath, which followed Cochrane’s ship, the Phoenix, back to Bozeman, Montana, after spotting it zipping around the solar system. The achievement of warp drive qualified humanity for contact with the Federation.

Now warp drive may or may not be in our future—I don’t know. But gravity control is within a hair of becoming an established fact, and I’m willing to bet that when it does—perhaps with the help of one or more readers of this book—it will be enough to bring about humanity’s Bozeman moment.

Returning to planet Earth briefly from this heartening vision, I have to say that it is just that—a vision, and nothing more. Even if it is true, it probably doesn’t mean the dawning of the Age of Aquarius or that we will all join hands and sing “It’s a small world after all.” More likely it means the beginning of a whole new age of anxiety for the human race. But temporarily at least it will be a cause for celebration, wonder, and hope.

Moments like that don’t come along very often, and each one represents an opportunity to take stock of who we are and what we are doing and start anew. It would be a tragedy of the highest order if we were to deny ourselves the opportunity to open that door by destroying ourselves just before the dawn of our greatest achievement.

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[28] *Prediction confirmed: An earthlike planet, Proxima b, was found circling one of the closest stars to our sun, Proxima Centauri, shortly before* How to Build a Flying Saucer *was put to bed.*

Chapter 23

FLYING SAUCER BASICS

WHEN DISCUSSING "ALIEN CRAFT" or "flying saucers" we rely on eyewitness accounts and published reports, not on insider knowledge of any kind. My dad had no access to secret documents, and as we will see, he didn't need any. One does not need to talk to an alien or step inside a UFO in order to understand their technology.

At the heart of every alien-built flying saucer is a propulsion system based on the electronic control of gravity and inertia. The hull and its interior architecture are designed for safe and efficient conduction of the gravity-neutralizing effect to the entire craft, which explains the longstanding mystery of the saucer shape, as well as the multitude of variations on symmetrical, non-aerodynamic design observed by witnesses around the world over the last seventy years and quite likely for centuries.

In other words, UFO design is completely *functional;* it has nothing to do with psychology or symbolism, as suggested by New Age wall posters and theorized by Carl Jung and other experts in fuzzy studies. Flying saucers are machines—incredible machines, to be sure—but nuts and bolts all the same. Their spiritual aura is purely in the eye of the beholder, which is both a relief and a caution against cargo-cult worship of them or their occupants. While we find the UFO phenomenon interesting, almost all study of it is highly speculative, which is why we are emphatically *not* students of UFO occupants and their mission. This is a book for scientists and engineers. Its subject is a new technology which is entirely understandable in terms of present technology.

Psychological phenomena don't impact the material world, something that even Carl Jung, an advocate of the bankrupt and patronizing psychological theory of flying saucers, acknowledged in his private letters. If UFOs were on trial, the material evidence they have left behind together with eyewitness accounts would be more than enough to convict them in a court of law. Of what exactly? Well, trespassing, burglary, catch-and-release kidnapping, cattle rustling and vivisection, and practicing medicine without a license for starters. Filing a formal complaint would be problematic, however. It's more likely that *you* would be locked up than the perpetrators.

Evidence of the material reality of UFOs includes photographs, videos, radar echoes, and impressions in the ground made by their landing gear. Witnesses have suffered burns from standing too close to a hovering UFO or one that is powering up and taking off. These burns are consistent with powerful microwave emissions. UFOs develop mechanical problems and sometimes crash, leaving debris behind. While specialized military retrieval units usually arrive in time to sweep up the wreckage, some debris has been recovered on occasion and found to have exactly the metallic composition my dad suggested to maximize the gravitational effects of his propulsion system (*see p. 214*).

Alien craft do not have wings, nor do they need them, yet they fly better, faster, and farther on less fuel than the most advanced fighter jet. For a flying saucer, the ascent from sea level into space requires virtually no fuel at all and can be accomplished at any speed in any weather. For rocket-based technology, a space launch is an elaborate enterprise requiring months of planning, hundreds of technicians on the ground, exhaustive calculations, colossal cranes and scaffolding, tons of volatile fuel, precise timing, and of course, good weather. A space launch in a flying saucer requires a pilot and a button-push inside the cabin. Energy expenditure is negligible. Weather is not an issue except in the case of electrical storms, which might disrupt the propulsion mechanism.

Human-built saucers, when they begin to be manufactured, will not be as nimble as their alien counterparts because they will lack the mighty power plant of an alien craft and the benefit of hundreds, if not thousands of years of engineering evolution. In principle, however, gravity control is easily attained with a conventional power plant, and the difference between gravity-control propulsion and aerodynamic flight will be greater than the difference between a biplane and an F-16. It will make escaping into space and subsequent maneuvering outside the Earth's atmosphere easy and economical. It will also enable transportation of large payloads into space and back, which in turn will enable us to realize the longstanding dream of mining, colonization, and the construction of space-based cities and factories. These projects are already on the drawing board, but gravity control will exponentially increase the scale of operations while decreasing the time it takes to get them underway.

Aerodynamic flight has never been able to replace or even compete with the automobile for private and public transportation. They exist in separate compartments. Gravity control, however, will bridge that gap enough to transform all kinds of transportation, public and private. The R&D time required to begin producing private vehicles is two to five years. Building the infrastructure to manage the massive increase in air traffic will take longer, and will keep the computer industry busier than ever.

In the following chapter and throughout this book, we will explain the practical motivations behind flying saucer design as well as features of their flight that seem to violate the laws of physics, such as instant accelerations and right-angle turns at supersonic speeds. The latter two features have kept debunkers scoffing for decades, but the theoretical foundation of the technology—which is consistent with mainstream physical theory—completely explains these mysteries. We've known for a long time that "they" were doing it. Now we know *how*. More important, experimental verification is readily available, as shown in *Chapters* 32, 34, and 38.

Incidentally, if we are able to duplicate saucer technology using data taken from the saucers themselves, it will constitute an almost airtight case for their existence. But as my dad used to say, “When *we* have flying saucers, it will be okay for the aliens to have them, too.” In other words, the “Are they real or not?” discussion will be relegated to the dustbin of history. In a few years it will be difficult to find anyone who will admit they ever entertained any doubt about whether flying saucers were real or not, just as it is difficult to find anyone today who entertains any doubts about the possibility of flight in tubular, metallic vehicles weighing many tons that routinely carry hundreds of passengers, bored and dozing, across oceans and continents to foreign lands and climes.

Chapter 24

THE TOP-TEN UFO RIDDLES

THE UFT and the applied technology derived from it offer the only complete explanation of UFO propulsion based on known and accepted science and present-day technology. This makes it possible to propose solutions for many longstanding riddles of UFO flight—not only to propose, but to *test*, with a view toward imitation.

Skeptics are particularly prone to retrospective opinion repair. When proven wrong, they often say that they “knew it all along,” and shrug off their error with the phrase, “Any fool can see that.” This is known as the “Columbus and the egg” phenomenon. We invite skeptics to write down their answers, if any, to the UFO riddles below *before* turning to the solutions. Hang on to those written opinions. When and if the 1994 experiment is successfully repeated, they will keep you honest.

Others will find these riddles indicative of a single, unified technology behind all the disparate UFO sightings by hundreds of thousands of witnesses all over the world, not only in the last 75 years or so, but for centuries past. It *is* possible to generalize about certain features of UFO flight. The problem until now has been drawing meaningful conclusions from these generalizations when the phenomena were impossible within the boundaries of accepted science. This book stretches those boundaries.

Part 1, which begins on the next page, poses the top-ten riddles. *Part 2*, *Answers*, begins on page 155, More scientific depth on the answers will be found in the publications listed on page 347.

PART 1: THE TOP-TEN RIDDLES

#1 – WHY THE SAUCER SHAPE?

Let's tackle the big one first: Why do alien engineers prefer saucers, or more broadly, wingless craft with axial symmetry?

Is it because they want to dazzle us with a symbol of spiritual unity? Is it because saucers are incorporeal, telepathic transmissions from interdimensional beings? Is it because the saucer shape reflects a subconscious projection of internal emotional conflicts that are epidemic in this age of anxiety? (How a "psychological projection" manages to return a solid radar echo is unclear, but more than a few brilliant minds apparently remain deeply enamored of this explanation.)

Or might the answer have a simple, rational, technological basis?

Friendly reminder: Skeptics, write down your opinion or voice your disdain for the question itself *before* consulting *Part 2*.

Answer on page 155.

#2 – WHAT'S HOLDING THEM UP?

If flying saucers have no wings, what holds them up in the air? How do they hover and then accelerate to hundreds or even thousands of miles per hour in a fraction of a second? Do they use some sort of "antigravity force field" to push against the Earth's gravitational field? Are they holographic projections from another universe? Are they hallucinations or mirages? Reflections on the inside of a car window?

Or can you come up with some better explanation, one that exercises Occam's razor and doesn't stray from the known laws of physics? This is one question you'll want answered before you go shopping for a personal flying disc or board an international saucer flight to the Moon.

Answer on page 156.

#3 – WHY DO THEY SPIN?

Why are flying saucers often seen spinning slowly while hovering? What, if anything, does this have to do with their propulsion system?

Professor Neal deGrasse Tyson, astrophysicist, mentioned the "saucer spinning" phenomena during an interview on StarTalk Radio hosted by Eugene Mirman in 2013 (see YouTube for clip). His analysis was succinct: It means "only stupid aliens build flying saucers."

Why is that? Answer: *Because they don't understand the laws of physics*.

"There are some fundamental problems with an entire rotating ship," said Dr. Tyson. "If you set it into rotation, something else has to be set rotating in the opposite direction." This counter-rotation is compelled by the law of conservation of angular momentum, which Professor Tyson rightly calls "one of the deepest laws of physics we know." It was also one of the first laws of physics that my father taught me, using a bicycle wheel as an illustration. I was about seven years old at the time. After fixing a flat tire, he had me sit in a swiveling office chair and hold the bicycle wheel by the bolts on the ends of the axle. Then he spun the wheel. When I tilted the axle, the chair turned. This is conservation of angular momentum. Similar demos using bicycle wheels and gyroscopes are repeated in Physics 101 classes all over the world.

So Dr. Tyson is right (and he hardly needs *me* to tell him so) when he says, "If you set it *[the craft]* into rotation, something else has to be set rotating the opposite direction." His implication seems to be that the rotating saucer hull—assuming it has to do with propulsion—represents a futile waste of energy. "Why spin at all?" Dr. Tyson asks. "I think it's because—when did the Frisbee come out?"

This isn't the first time "Frisbee ridicule" has been employed. Air Force propaganda films of the 1950s featured two guys in uniform tossing a garbage can lid back and forth while laughing at the idea that anyone in their right mind would believe in flying saucers. They should have talked to the military personnel, some of them high-ranking officers and pilots, who've testified on behalf of the Disclosure Project. Their encounters with flying saucers seem real enough.

Most skeptics have a sarcastic streak, but it's hard not to like Dr. Tyson. He is a great speaker and I applaud all he does to promote science, especially among young people. However, I think that in this case, his conclusion that aliens are *stupid* might be a bit premature, because there *is* an explanation for saucer spin, and he was hot on the trail of it. All he had to do was consider that when a large number of witnesses agree on an observation, there *might* be some truth to it, and take the next step. If he had, he might have concluded that the rotation of the hull was a *side effect* of the propulsion system, rather than a pillar of it. From there he might have reasoned backward to the source of that angular momentum.

Can you?

Answer on page 165.

#4 – HOW DO THE OCCUPANTS SURVIVE THE G-FORCES?

Flying saucers, and UFOs in general, are known for dramatic accelerations: right-angle turns at high speeds, instantaneous, zero-to-Mach-3 takeoffs from a hovering position, erratic, jerky flight paths that make absolutely no sense in terms of physics or aerodynamic flight. In *UFOLOGY (see fn. 24)* Jim McCampbell cites an analysis of a UFO takeoff that concluded it would require as much energy as an exploding A-bomb and generate temperatures in the neighborhood of 85,000°

C (no, that's not a typo).[29] Ergo, there can't be any such thing as a "real" flying saucer. Case closed.

Unless maybe there's another explanation. How *do* those UFOs get away with violating the laws of physics, anyway?

Answer, page 171.

#5 – WHY DO UFOS FLY LIKE SKIPPING STONES?

The first flying saucer sighting of the modern era *(excluding the 1942 Battle of Los Angeles; see p. 138)* occurred June 24th, 1947, in the Pacific Northwest. The witness was Kenneth A. Arnold, a businessman and an experienced pilot. A couple of weeks later, on July 8th, his story was overshadowed by national headlines about an alleged UFO crash near Roswell, New Mexico. The drama of crashed discs, alien bodies, and military cover-ups will always eclipse a mere sighting, but Arnold's brief encounter with nine flying discs is historic because it gave us the term "flying saucer."

Arnold was an experienced pilot [30] whose Boise, Idaho, business took him all over the Pacific Northwest. On June 24th, at 4 P.M., he stepped out of his light plane in Yakima, Washington, and into UFO history when he reported seeing a squadron of nine flying discs weaving between mountains and valleys near Mt. Rainier at an estimated speed of 1,700 miles per hour. Arnold got a prolonged daylight view of the objects through the open window of his light plane (in other words, they were not interior reflections, as skeptics are fond of claiming, as if people, like rabbits, could not tell the difference) and he provided the press with a sober, impressively detailed account of his sighting.

The fastest plane at the time was the Lockheed P-80R Shooting Star, a fighter jet, which set a record of 623.4 mph the same month as Arnold's sighting. However, unlike the P-80R or any other airplane or jet before or since, the objects that Arnold saw flew with an *undulating* motion, like skipping stones, or "fish flipping in the sun." Because of this exceedingly odd combination of characteristics, the headline in the *Chicago Sun*, June 26th, 1947, read "Supersonic Flying Saucers Sighted by Idaho Pilot."

In reality, however, Arnold told the press that the objects were crescent-shaped, like a croissant, and smooth, that is, lacking in cowlings, cabins, or rudders. It was the skipping-stone motion that triggered the "flying saucer" description, and it has held up well over the years, since so many UFOs are, in fact, disc-shaped and fly with a skipping-stone movement.

Assuming Arnold and all the other witnesses who've seen flying saucers and noted their undulating motion aren't participants in some sort of bizarre conspiracy or an outbreak of mass hysteria that has lasted seventy years, what explains the skipping stone motion uniquely associated with flying saucers, and why doesn't that supersonic "undulation" churn the occupants into strawberry jelly?

Answer on page 173.

#6 – WHY ARE THE ANDES A UFO HOTSPOT?

In 2008, with the blessing of Sernatur, Chile's official tourist service, the town of San Clemente opened a nineteen-mile "UFO trail" into the Andes. The area near San Clemente has been a hotbed of sightings and alleged UFO landings ever since 1995. Long before that, a plaque was erected on an Andes trail advising hikers to "Wave at our space brothers as they pass by." And don't forget the ancient Peruvians who fashioned geoglyphs up to nine kilometers long in the southern desert. The Nazca Lines, as they are called, only make sense when viewed from the air. Who were these pre-Columbian artists trying to impress?

So why are the saucer pilots mountain-hopping along the jagged peaks? Are these merely rumors planted by Chile's tourist industry?

Maybe so, but January 1st, 2011, was the date of a close encounter between a Cessna carrying tourists on a sightseeing flight over the Nazca Lines and a classic, hat-shaped flying saucer that ducked in and out of a rain cloud that suddenly engulfed the plane. Rain clouds are practically unheard of over the arid plateau, by the way. (An HD video of the close encounter is available on YouTube, and the saucer is clearly visible in the frame-by-frame analysis).

Are the aliens attracted by the high mineral content of an alleged high-altitude landing site, as hypothesized by residents of San Clemente? Are they attracted by the Nazca Lines? What's going on?

One more clue: The saucers prefer to fly along the ridges of the mountain ranges. Why?

Answers on page 174.

#7 – IS THERE A CONNECTION BETWEEN UFOS AND CROP CIRCLES?

Do UFOs have anything to do with crop circles—the genuinely mysterious kind, of course, not the "Doug and Dave," plywood-planks-and-foot-stompin' kind?

Before you answer, Google "crop-circle images" and consider the intricacy, complexity, mathematical ingenuity, and sheer scale of the images woven into the wheat and barley fields of southwest England. A host of subordinate questions surround the phenomenon (see below).

Q1: *How are crop circles formed? How do they form so quickly?* The time it takes to complete all 400 component circles of your 800-foot-in-diameter masterpiece will be ten to fifteen seconds. At least, that's what witnesses who've seen the circles form say. Maybe they were drunk or deluded. What do you think?

Q2: *And why circles, by the way*?

Q3: *How much energy does it take to form a crop circle, and why is this a clue to the (alien) rationale for the whole phenomenon?*

Q4: *Beams of light have been seen coming down through clouds at the same time the circles form. What's going on there? Or can we put it down to too much whisky and a mass hallucination?*

Q5: *Airborne orbs (small, metallic spheres) are often seen skimming the fields just above the tops of the grain before the circle forms (videos of orbs in action appear on YouTube). What are "orbs," and what role, if any, do they play in creating the formations?*

Q6: *Dead animals are seldom found inside the circles, but when they are, the corpses have been flattened as if squeezed in a hydraulic press. How are the animals flattened, and why are there so few ever found?*

Q7: *Why do the crop-circle crafters seem to prefer fields in the general vicinity of Stonehenge? Are they druids? Or are the farms in the vicinity rife with hoaxsters with too much time on their hands?*

Answers on page 176.

#8 – CAN YOU EXPLAIN THE SPARTAN INTERIOR OF A UFO?

Witnesses who claim to have seen the inside of a flying saucer—such as Roswell cover-up participant Col. Philip J. Corso,[31] alleged Area 51 whistleblower Bob Lazar, and UFO abductee Travis Walton—all remark on the stark barrenness of the interior.

How can UFOs hover silently and take off from treetop level into space at blinding speeds without a whisper, maneuver like a bat out of hell, and accomplish these miracles without benefit of instrument panels, machinery, pipes, moving parts, fuel tanks, roaring rockets, and a suitably large and thunderous pillar of flame?

Answer on page 179.

#9 – THE NOBEL-PRIZE-WINNING QUESTION

Once upon a time in the far-off, impossibly wealthy and supercilious kingdom of Palo Alto, I used to play chess with a Nobel-Prize-nominated physicist from a certain university that shall remain nameless. He was an affable fellow who never boasted about his accomplishments, and I always enjoyed our conversations. All of that changed when I gave him my father's unified field theory paper and hinted that the experiments with gravity control had been a success.

A month later, we were sitting at a table outside a coffee shop in South Palo Alto. My curiosity got the better of me and I asked him if he'd had a chance to look at it.

A dark cloud suddenly passed in front of his face. "Just a second," he said with a frown, as he opened the briefcase by his chair. He reached in, removed the paper, and tossed it across the table at me (the words "like a Frisbee" come to mind). I had to smack the flipping pages down with my open hand to keep them from flying onto the sidewalk.

"I don't *have* to read this!" he said. "It's all bullshit!"

"Really? How so?" I asked, steeling my nerves for the Nobel-Prize-winning decimation of my dad's theory.

The professor's face turned beet red, his eyes bulged, his nostrils flared. I was genuinely afraid that he might be on the verge of a heart attack. "Look," he said, with beads of sweat breaking out on his forehead and flecks of spittle flying from his lips to the tabletop between us. "Suppose you turn on your father's antigravity device and raise a hundred-pound sack of cement six feet in the air, and then you switch it off and the sack falls to the ground—*where does all that kinetic energy come from*? Huh?! It violates the law of conservation of energy!"

Then he leaned back in his chair and waved his hand with the authoritative air of a Pope issuing a decree. "Ask your father *that* and *then* get back to me!" he said.

Needless to say, this was the end of the conversation. Pretending not to have noticed anything out of the ordinary in the professor's Jekyll and Hyde transformation, I excused myself politely, and left with a friendly goodbye.

And yes, I *did* ask my father the question, but evidently the professor's request to "get back to him" with the answer was insincere, as the chess cafe closed soon after and my attempts to get in touch by email went unanswered. Though it may be hard to believe, this is the closest to a rational discussion of the UFT with a member of the academic community I heard in more than fifty years. And yet Richard Feynman thought an early version of the UFT was interesting enough to engage in two hours of lively discussion with my father. *Quel dommage*, as we say over a hard-fought but hopeless position in chess. How would you blow the professor's Nobel-Prize-winning question out of the water in two sentences?

Answer on page 181.

#10 – WHY DO CAR ENGINES AND HEADLAMPS SHUT DOWN?

In movies such as *Close Encounters of the Third Kind*—and more recently in the FX network series *Fargo*, Season 2—a UFO flies overhead, and automobiles, headlamps, car radios, and other electrical systems ominously flicker and die.

As far back as 1968, the Condon Committee, a panel of scientists commissioned by the U.S. Air Force to study UFOs, documented this weird phenomenon. The investigators considered the role of electromagnetic fields, but rejected this explanation after determining that any field strong enough to interfere with an automobile's ignition system would leave residual magnetism in metallic parts of the vehicle. No residual effects were found in a vehicle that purportedly shut down during a UFO event.

Heat, light, information, freedom of movement, control of our environment—civilization itself depends on the power grid. By taking away our power, our *electrical* power, the aliens symbolically reduce us to primitive, terrified, childlike impotence.

The psychological dimension of events such as these may be known, but did the brilliant scientific minds behind the Condon Report miss something when they concluded that an electromagnetic field couldn't have done it?

If the power shutdown really occurs, is it intentional or unintentional? Should we view it as "ominous" or just a side effect of UFO propulsion technology? If so, what is the mechanism? Or are you happy with the explanation offered by the Condon Committee, namely "It never happened because it couldn't have happened"?

Remember, brute force electromagnetism is a guess that the Condon Committee successfully debunked; it is *not* an adequate explanation. You will need to go deeper.

Answer on page 182.

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[29] *See* UFOLOGY, *p. 84, 1973 edition*

[30] *Arnold had logged over 9,000 hours in the air at the time of his sighting, close to half of them devoted to Search and Rescue Mercy Flyer missions. Besides being a pillar of the community, he was a skilled observer and well-versed in the profiles of other aircraft of the era, which is one of the reasons his sensational report was so credible.*

[31] *fn.21,p. 105*

PART 2 – ANSWERS TO THE TOP-TEN RIDDLES

If you have a scientific background, please do *not* read the "Answer" section until you give each riddle serious consideration. The point of wrestling with the riddles is to get a gut-feeling for the difficulty of finding a rational explanation, let alone a scientific solution. These questions have baffled investigators for decades. Here you will find answers that are, whether correct or not, at least amenable to scientific investigation and experimental verification.

#1 – WHY THE SAUCER SHAPE?

One morning in 2005, while staying at my dad's house in Oregon, I rolled out of bed, trekked past the living room, and stumbled up the staircase to his study to see what was on the agenda for the day. The door was open, so I peeked inside and discovered that he was already up, sitting at his desk and reading a magazine. "Come in," he said. "There's a page in a book I'd like you to look at. I think you'll find it interesting. It's on the top shelf of the bookcase on your right."

The hardbound book was so old that the title had worn off the spine. It was one of the driest technical tomes I'd ever seen. The type was small and crowded together so tightly it was barely legible. The equations, which were abundant, provided the only visual relief outside of a few circuit diagrams. He said it was about radar technology.

"I got it at a library sale downtown. Amazing what you can find for fifty cents."

"What do you want me to see?" I asked as I thumbed through the pages.

"Do you have any idea what an 'ideal' radar antenna looks like?" he asked.

"None whatsoever."

"Just turn to the bookmark."

Sure enough, the upper left side of the bookmarked page held a diagram of a parabolic radar antenna rotated halfway on its side. "Ideal Radar Antenna" read the title below it. The equations described the shape in detail.

"What about it?" I asked.

"Remind you of anything?"

Then I laughed out loud, because it was obvious and yet I hadn't seen it: The "ideal radar antenna" looked exactly like the upper half of an "ideal flying saucer."

“Blew my mind when I saw it, too,” he said. “But it makes perfect sense. Radar is made up of electromagnetic waves, *microwaves*. So if you want to conduct microwaves from a central power source with the greatest efficiency, *this is the shape you would choose for your hull*. You clap two of these ideal antennae together face-to-face, and what do you have?”

“A flying saucer.”

“Precisely!”

It was at that moment that UFOs stepped out of the realm of mystery and conjecture for me and into the realm of nuts-and-bolts machines.

Alien craft come in a multitude of configurations, but the vast majority are either saucers or spheres, or some variation on the theme of axial symmetry. The typical cigar-shaped hull of a jet aircraft would be a poor choice for a flying machine utilizing the microwave-driven gravity-control system described in this book, but a saucer is perfect. This cannot be mere coincidence, especially in light of the “key sighting” described in *Chapter 18 (p. 109)*.

Axial symmetry is preferred because it is the most efficient way to conduct the microwave pulse necessary for nuclear orientation to the extremities of the hull. Orientation itself can also be conducted from the core. Spheres, equilateral triangles, and birthday-cake shapes would work all right, too, but a saucer—which is simply two ideal radar dishes clapped together with a dome-shaped cabin on top—is the most efficient design of all, and not surprisingly, it is the one seen most frequently.

As my father wrote in his 1982 MUFON Symposium paper, “A UFO Propulsion Model”: “In order to conduct...the ordered state to...the surface of the vehicle...it would appear to be convenient to adopt a circular cross-section in the plane of the order-conducting wires.”

The “order-conducting wires” were envisioned to be wires or ribbing of pure aluminum or magnesium with iron or chromium inclusions that would assist in the penetration of nuclear orientation from the generator to the edges of the ship. The use of wires would relieve the power requirements for maintaining nuclear orientation in spatial extent. All shapes *other* than a smooth saucer complicate delivery of nuclear orientation and increase power requirements.

#2 – WHAT’S HOLDING THEM UP?

One of the puzzles for scientists is where flying saucers get *lift*, or to break it down further, “How do they remain airborne without wings or propellers? Related UFO riddles include, “How do they hover silently, like a helicopter, and then accelerate so quickly that the human eye can barely follow?”

These questions represent the superimposition of the standards of one technology—aerodynamic flight—upon another that is based on entirely different principles. The error is hardly surprising, since aerodynamic flight is the only flight we know. Non-aerodynamic flight does not exist insofar as science is concerned. Skeptics do the same thing when they "debunk" eyewitnesses with recitations from textbook physics. Once gravity control is understood, however, the riddles vanish.

In my father's view, gravity control was only *half* of a two-part propulsion scheme. While the technology eliminates weight and inertia, it does *not* create thrust, which is why the term "antigravity" is a misnomer. Once a vehicle is weightless, some form of thrust is needed to propel it through the atmosphere or out into space. True to his theory, UFOs routinely exhibit a combination of gravity control and some other form of propulsion.

We can illustrate the latter point with one of the most famous cases in the annals of UFO literature.

Around ten minutes to six p.m., April 24th, 1964, on the southern outskirts of Socorro, New Mexico, a 31-year-old police officer named Lonnie Zamora was chasing a speeding car when he heard a loud roar and saw a flame descending behind a hill next to the road. Zamora was aware that there was a dynamite shed nearby and he was afraid that some kind of an explosion had occurred. He abandoned the chase, spun his patrol car around, and, after three attempts, managed to gun it to the top of the low hill amidst a cloud of dust kicked up by his tires. As a stiff wind from the south cleared the air, he saw an eerie and puzzling sight: an egg-shaped object standing on four legs in the desert about two hundred yards away. Its color, said Zamora, was "aluminum-white,"[32] and it had a red insignia (which he later sketched) on the side. Two humanlike figures wearing "white coveralls"[33] were standing on the ground next to the craft.

When the occupants saw Zamora come over the hill, they appeared to be startled and retreated into the craft. A moment later, just as Zamora left his car, the flame came on again. The ship rose slowly straight up, and after hovering for roughly twenty seconds, the flame went out and it shot sideways, clearing the top of the nearby dynamite shed by three feet. The egg-shaped object flew silently across the desert away from Zamora at an altitude of 15 feet, accelerating so rapidly that it seemed to "get small in the distance very fast." Its peak speed was later estimated at 720 miles per hour.

The Zamora sighting, which included trace evidence, such as a patch of fused desert sand at the landing site, generated an uproar and was exhaustively investigated by the Air Force, which had no explanation in the end. The usual suspects, notably arch skeptic and *Aviation Week* journalist Philip J. Klass, were quick to cry "hoax" or "mirage of Canopus." But in spite of Klass's efforts to force the evidence to fit his preconceived opinions, a secret report prepared by the CIA and published by NICAP (a reputable civilian UFO investigating agency), Project Blue Book director Air Force Major (later Lt. Col.) Hector Quintanilla said, "He *[Zamora]* is a serious police officer, a pillar of his church, and a man well versed in recognizing airborne vehicles in his area. He is puzzled by what he saw, and frankly, so are we."

In his well-known "Last Will and Testament," published in 1983 (twenty-two years *before his* death), Philip J. Klass delivered his infamous "UFO Curse":

> *To ufologists who publicly criticize me, ...or who even think unkind thoughts about me in private, I do hereby leave and bequeath: THE UFO CURSE: No matter how long you live, you will never know any more about UFOs than you know today. You will never know any more about what UFOs really are, or where they come from. You will never know any more about what the U.S. Government really knows about UFOs than you know today. As you lie on your own deathbed you will be as mystified about UFOs as you are today. And you will remember this curse.*[34]

Klass's oddly worded "curse" reads more like a taunting boast: "I know something you don't know, and you're never going to find out, *ha-ha.*" But, to give the devil his due, Klass's curse is holding up pretty well. We seem to have gotten a few rare and tantalizing glimpses of what goes on behind the curtain, such as Col. Philip J. Corso's *The Day After Roswell*.[35] Or have we? Ultimately the lack of verifiability of disclosures such as Corso's keeps them in the netherworld of UFO conspiracy. But let's see if we can let a little verifiable sunlight in. I would hate to think of the readers of this book lying on their deathbeds as mystified about UFOs as they are after yet another mind-numbingly boring YouTube video or a sleep-inducing episode of *UFOs on Parade (Maybe)* on cable TV.

When I read about the Zamora sighting in the '60s, I found certain aspects of it rather puzzling. The use of a rocket to ascend and descend seemed "normal" by Cape Canaveral standards, yet very odd, since the object clearly didn't have the fuel capacity for a space launch. The rocket itself, as noisy as it was, seemed relatively small—appropriate to a lunar probe or a Mars lander perhaps, but not to escaping the gravitational field of the Earth. In other words, the rocket described by Zamora didn't seem big enough even to lift the egg-shaped object off the ground, let alone into space.

Also, why was the rocket located in the middle on the underside of the egg, instead of the tail, where it could have provided forward propulsion? And if propulsion was effected by a rocket, why wasn't the vehicle *shaped* more like a rocket? It was also puzzling that the flame shut off just before the object took off laterally at great speed. From 1964 to 1981, my most nagging question was, "*Why*, if the aliens had antigravity, were they mixing primitive rocket technology with it?" It reminded me of nothing so much as the cheesy covers of some of my father's science-fiction magazines from the 1950s, and therefore I had trouble believing any of it.

My father's theory of gravity control, however, resolves these perplexing puzzles and contradictions.

The first clue is that the rocket in Zamora's egg must have ignited close to the ground, probably at an elevation of around 75 feet, given the elevation of the hill that Zamora climbed in his patrol car (25 feet). Zamora reported that he was chasing a speeding car when he "heard a roar and saw a flame in the sky to *[the]* southwest some distance away—possibly a half mile or a mile." The sound and the flame occurred together, and nothing beforehand. If the egg had arrived from space with rockets blazing, half of Socorro would have seen and heard it. Several independent witnesses corroborated Zamora's story of the landing. He was closest to the event, so he got the best view of it. The point for us is that the rocket was used to cover the last 50 to 100 feet to the landing site and the *reverse*, the 15 or so feet between the ground and lateral flying altitude. The purpose of the rocket was *not* to supply propulsion through the atmosphere.

Why was that? Why use a rocket at all?

Let's assume that Zamora's egg, entering the atmosphere from outer space, decreased its altitude by increasing its interaction with the Earth's gravitational field. This approach to landing worked until it had descended to within 100 feet or so of the desert surface. Here, perhaps, it hovered momentarily before covering the last lap to the ground.

Hovering, which saucers are often seen to do, is no great trick. Antigravity allows the pilot to make use of another force: buoyancy. Like a lighter-than-air balloon, a weightless saucer (or Zamora egg) has a tendency to float upward, based on the weight of the air it displaces. For example, a flying saucer ten meters in diameter and two meters thick displaces 5,540 cubic feet of air, which weighs in at 425 lbs. In other words, the pilot must dial back on the gravity-control lever a bit to "add" 425 lbs. of ballast to the saucer, just to achieve neutral buoyancy.[36]

However, the same ballast-adjustment technique won't do for a vertical descent to the ground. Increasing the weight of the vehicle so that it begins to fall and then "returning the lever to neutral" just above the ground will *not* arrest downward momentum, and the vehicle will crash. In order to obtain braking action, the "weight control lever" must reverse sharply to increase buoyancy and then cut back to neutral. However, the response time of the gravity-control mechanism and the buoyancy lift it generates depends on how rapidly nuclear orientation can diffuse through the hull. Quickly neutralizing 500 lbs of weight and gaining enough lift within one meter of the ground would be problematic. Besides the time it takes to induce the gravity-control effect, there is the tendency of a craft with non-neutralized weight to wobble (see *UFO Riddle #3)*. This is a difficult condition to manage, as shown by the incident described in *Chapter 22 (p. 139)*, where a 300-ft saucer attempting an emergency takeoff was seen wobbling like a dinner plate on a table top over an interstate highway, with its violently undulating rim barely clearing the asphalt.

Wind may also cause sideways drift as a ship attempts to land. Zamora reported winds "blowing hard" out of the southwest, based on the clouds of dust kicked up by his tires as he climbed the dirt road to the crest of the hill. Preventing wind-drift may have been another reason for firing up the rockets. I say "rockets," because we don't know for sure that there were not smaller, flameless jets on the sides of the craft, whose role was to stabilize it and maintain its position in relation to the landing site.

Saucer engineers have developed a number of ways to compensate for the problems of gravity control. One is the "falling leaf" descent pattern often seen by UFO witnesses. The saucer lowers one edge, slips sideways as it descends, then tips back to a level position and lowers the opposite edge, descending in the opposite direction. The process repeats until the saucer is close enough to lower landing gear and safely drop the last few feet to the ground. On page 83 of his 1973 book *UFOLOGY*, nuclear engineer Jim McCampbell analyzed this pattern in detail.

To paraphrase McCampbell, as the scenario commences, a force from the hovering saucer is counteracting the weight acting downward, which we assume to be rather minimal. Jim didn't say what that lifting force might be. Within our theory, it can't be "antigravity" because gravity has no polarity. All that gravity-control does is reduce the interaction between the Earth's gravitational field and the vehicle, diminishing the vehicle's weight.

The force could be buoyancy, which we've described as problematic, but another clue comes from alleged Area 51 whistleblower Bob Lazar, who diagrammed the interior of an alien saucer he called the "Sport Model," which he allegedly saw while working on a reverse-engineering project at Area S4, a super-secret facility roughly 15 miles from the main site at Area 51. Workers at Area 51 have no clearance to visit S4 and presumably "no need to know," so they probably have no idea about what goes on there and might even laugh at the notion that it harbored alien discs. Lazar claims he was flown to the main site, then driven to S4 in a bus with blacked-out windows. While photographs of Area 51 exist, there are *no* photographs confirming the existence of S4, which Lazar and other witnesses have said is housed in camouflaged bunkers built into the side of a mountain.

The fence that protects Area 51 is well-known, so it is worthwhile to pause and warn curiosity seekers *not* to attempt to trespass. It is an absolute certainty that you will be detected *miles* from the facility, and the penalties for hopping the fence are severe, up to and including being shot dead. *DO NOT DO IT.* The government is carrying out national defense research at Area 51 and has the need and the right to protect its secrets. Even if you were to get deep enough to look at the Groom Lake facility, you wouldn't see any saucers there, and in all likelihood wouldn't see anything interesting at all, even with binoculars. Lazar and other witnesses have placed the research area much deeper in the vast test range. To give you some idea, when you look out at the ocean, the horizon is roughly fifteen miles distant. the Area S4 facility, if it exists at all, is at least double that distance from the U.S. government fence near Rachel on the Extraterrestrial Highway (the state designation for Nevada State Route 375).

Bob Lazar is a highly problematic witness whose credentials have been impeached by respected UFO investigator Dr. Stanton Friedman. We will overlook these issues temporarily to focus on his detailed diagram of the Sport Model, which is a plausible design within the boundaries of our theory. We differ, however, in our interpretation of its features. As described by Lazar, the Sport Model was 16 feet high and 52 feet in diameter. The interior was horizontally divided into three levels. The lower level housed three "gravity amplifiers" that he says were integral to the propulsion system. Lazar's explanation of the amplifiers involves a mix of general relativity and an unproven concept of two kinds of "gravity waves": one that exerts the attractive force we are all familiar with, and the other that exerts an "antigravity" repulsion force. The "amplifiers" focus the latter.

Lazar delivers his explanation of UFO propulsion rapidly and confidently, but as soon as he invokes an unverifiable theory, such as “polarized gravity waves,” for which there is no credible evidence, we are already hip deep in a swamp leading into the depths of Philip Klass’s “UFO Curse.” My father’s proposed technology, on the other hand, provides a much simpler, straightforward analysis of the lower level of the Sport Model.

As soon I showed my dad the Testor’s model of Lazar’s saucer in 1996, he pointed to the structures in the lower level and said that rather than “gravity amplifiers,” they were probably what they appeared to be: powerful electromagnets mounted on independent pivots. To him, their purpose was transparent: interacting with the Earth’s magnetic field, which, unlike gravity, *does* have polarity.

The energy in the Earth’s magnetic field is 0.25 to 0.65 gauss at the surface of the planet, a minuscule amount, but, as we have all seen, more than enough to induce wild gyrations in a compass needle. Under the influence of gravity control, a vehicle such as the Sport Model would weigh *less* than a compass needle. Now imagine a “compass needle” carrying three powerful electromagnets, as seen in the Sport Model. By changing the direction and power in each magnet, the vehicle would be capable of astounding mobility and accelerations, *without burning fuel or making a sound*. This, by the way, is the solution to another UFO riddle: silent hovering and bat-out-of-hell accelerations.

The speed and maneuverability of such a vehicle would depend on the amount of energy delivered to the electromagnets. Lazar described an “antimatter reactor” aboard the Sport Model that used element 115, which was predicted but unconfirmed at the time. In 2003, element 115 *(muscovium)* was synthesized. Only one problem for Lazar: instead of being stable, as he predicted, it was extremely radioactive, with a half-life of 220 milliseconds for its most stable isotope. Conclusion: The jury is still out, but at the moment it’s not looking good for Lazar’s reactor. Nevertheless, *some* kind of reactor would be needed to power a vehicle such as the Sport Model.

In *UFOLOGY (pp.* *97*, *98)*, Jim McCampbell used a crude approximation of the microwave energy emitted by two hovering, ten-foot-in-diameter UFOs to infer a net power source of 1.6 megawatts, roughly equal to a diesel locomotive. Whatever the power source, the alien craft evidently have plenty of energy left over after activating the gravity-control system, more than enough to light up a trio of heavy-duty electromagnets for the propulsion system.[37]

Incidentally, the positioning of the reactor and the use of the term “wave guide” in the Sport Model diagram checks with the solution to UFO Riddle #1. Besides the energy for the electromagnets in the lower level, the reactor can generate pulsed microwave radiation and attendant nuclear orientation below the shielded cabin in the top level, and transmit both of these to the hull of the craft via a central wave guide and, presumably, radial spokes of aluminum with colloidal magnesium or chromium inclusions. Properly speaking, the top and bottom halves of the hull are “wave guides.”

The "Detroit-built" saucer described in Chapter 14 was designed with a turbojet propulsion system, rather than the electromagnetic system of the Sport Model (and in all probability, Zamora's egg). This was so that the majority of power available to the craft could be invested in gravity control. The croissant shape—a modified flying-wing design—was envisioned as a way to obtain a modicum of aerodynamic lift and stability at cruising speed. Once the craft is airborne and traveling at speed, two scoops on the underside admit a stream of air to turbine generators that maintain the gravity control effect at full power without draining the batteries or the capacitor. Such a vehicle would not be capable of spaceflight, however. The UFOs spotted near Mt. Rainier by pilot Kenneth A. Arnold in 1947, just a week before the Roswell incident, were apparently designed along similar lines. Though the press christened them "flying saucers" (the first public mention of the name), Arnold described them as "half-moon shaped, oval in front and convex in the rear," somewhat like a croissant.

The presence of electromagnets in the lower level of the Sport Model would provide corroboration of the technology proposed in this book because it exhibits the predicted split functionality of gravity control and propulsion mechanism. Even if one considers Lazar's testimony suspect, this is still an interesting coincidence. Lazar's description of the propulsion system may have been truthful and at the same time misinformed, since it is conceivable that if he participated in a reverse-engineering project, he only stayed long enough to absorb the flawed conjectures of the investigator he replaced (according to Lazar, he was hired when another investigator died in a reactor explosion).

To Lazar's credit, he has also readily admitted his limitations as a physicist—in fact, he alleges this was one of his motivations for "going public" with his story: He was appalled that a discovery of this importance was being investigated by second-rate scientists such as himself who were also crippled by the overweening secrecy and compartmentalization of the program.

In favor of Lazar's honesty, his description unintentionally provides corroboration of his contention that the Sport Model was a *shuttlecraft* dedicated to traveling between the Earth's surface and a space-based mothership with interstellar capability. Earth is one of five planets in the solar system with a strong magnetic field, the others being Jupiter, Saturn, Uranus, and Neptune,[38] thus it is an ideal candidate for a shuttlecraft with an electromagnetic drive. Such a drive would probably *not* be very useful for interplanetary, let alone interstellar travel.

Back to the Zamora sighting now, where electromagnetic lift provides the missing link in Jim McCampbell's falling-leaf descent scenario: When last we left our hovering saucer (or egg-shaped shuttlecraft), it was riding on a combination of buoyancy and onboard electromagnets pushing against the electromagnetic field of the Earth. Now the pilot decreases the gravity control, which adds a little weight to the vehicle, and without modifying the lifting force, says McCampbell, the pilot tilts the craft to one side by a small amount (angle A). The force holding the saucer up would then make an angle A with the Earth's electromagnetic field, but the weight of the craft (still very small) would continue to pull it straight down toward the Earth's surface. The consequences would be a force gradually building up to the small value of $F \sin(A)$ and pushing the craft gently in the direction of the tilt, while the force holding the craft up would be reduced to the value *F cos (A*), or slightly less than the original value. The net effect of these forces would be to cause the craft to sink slowly as it slid sideways in the direction of the tilt. The tilt lever would then be returned to neutral, the saucer would level out, and the same maneuver would be repeated on the opposite side. (The procedure, which probably doesn't involve a literal control lever, would be orchestrated by computer.) McCampbell points out that in this manner the craft could be brought near to the ground with no hazard of overshooting a safe altitude *because the original, balanced forces have never been altered*. The safety of the procedure accounts for the prevalence of the falling-leaf pattern in UFO descents.

The demands of a takeoff are different from those of a descent, which is why the falling leaf pattern is never seen in reverse. First, there is the activation of gravity control, during which buoyancy generates lift. Second, since the vehicle is capable of extremely rapid accelerations, the pilot must be certain that the flight path is clear of obstructions. Close to the ground, this would include trees, houses, and power lines. Higher up and farther out, concerns include hills and mountains, thunderclouds (electrical storms may threaten the entire propulsion system), and most important, nearby aircraft.

For this reason, UFO pilots generally adopt a two-stage launch strategy: They use buoyancy to rise gently and cautiously, like a balloon, until they reach a holding altitude where they can survey the flight path and use remote sensing to detect any aircraft in the area. Then they energize their jets, rockets, or electromagnetic drive, and take off with astounding speed. The entire procedure seems to have been greatly abbreviated in the emergency circumstances of the China Lake incident *(p. 139)*.

In light of our theory of UFO flight, let us revisit the Zamora incident from the alien point of view:

Around 5:44 PM on April 24th, 1964, a crew of aliens in an egg-shaped alien shuttlecraft flying above the desert on the outskirts of Socorro, New Mexico, spy a desirable landing site. Perhaps their intent is to collect plant samples. Perhaps their ship has heating problems and they need to touch down to repair the hull. Perhaps, as has been suggested, they meant to touch down somewhere else, such as nearby White Sands proving ground, and meet a delegation from the U.S. Air Force. We can speculate endlessly about their motives; all we know *for sure* is that for some reason they decide to land.

The pilots begin their descent. The white, aluminum-hulled craft has a gravity-control system powered by a small onboard reactor which has rendered the craft close to weightless. Against an azure New Mexican sky filled with wispy clouds, they silently zigzag toward the ground in a lazy, falling-leaf pattern, using movable electromagnets in the belly of the craft to rappel against earth's magnetic field while dialing back on gravity control to give the craft negative buoyancy, like a balloon that has become low on helium.

Near the ground, the ship encounters gusty winds from the south and begins to drift sideways. The pilots find it necessary to add weight and switch on rockets to stabilize the craft for the final leg of the descent to the desert floor. Unfortunately, the sudden explosion of sound and light draws the attention of several witnesses, including officer Lonnie Zamora, who is chasing a speeding car down the highway half a mile away.

As their craft settles to the desert floor with landing gear extended, officer Zamora, thinking a nearby dynamite shed has exploded, abandons the chase and doubles back, heading toward an intervening hill, out of sight of the alien flight crew, who open the hatch float to the ground (yes, individual gravity packs or a gravity-free “stairway” to the ground are both possible).

Suddenly—from the alien point of view—a cloud of dust rises behind a hill a quarter of a mile away. Zamora’s black-and-white bursts into view and slams on the brakes. They’ve been seen! Worse yet, the “alien” (Lonnie Zamora) is driving some kind of military vehicle. The interloper is probably armed and has already radioed for reinforcements. A clandestine landing is rapidly on its way to becoming a catastrophe! Under strict orders to avoid contact with the natives—who are known to be extremely fearful, suspicious, hostile, and violent—they hastily climb back into their egg-shaped vehicle and initiate emergency takeoff procedures.

The reactor begins pulsing nuclear orientation throughout the hull, reducing their weight enough to make a power launch. Their rocket ignites and the ship begins ascending slowly on a blue flame. They reach hover-and-survey altitude, retract landing gear, and begin to recon their surroundings while the gravity-control effect fully saturates the ship’s hull.

There is no time to wait and see if military aircraft are on the way. If they are, a vertical launch might draw fire, perhaps from radar weapons that would disrupt their propulsion system and send them plummeting back to the ground (as may have happened at Roswell in 1947). So the alien crew chooses to escape stealthily by a low-altitude route over the desert, literally below the radar. Their goal is to put a few miles between themselves and the human witness in the black-and-white vehicle, who might report their flight route to his superiors. Only when he is safely out of sight will they make the ascent into space.

The ship hovers at neutral buoyancy. They shut off the rocket and engage the electromagnetic drive, instantly accelerating to 720 miles per hour on a level trajectory toward a distant mountain range. In their haste, they come within three feet of the roof of a nearby dynamite shed.

In a matter of seconds they have cleared the area and the “alien” has shrunken to a distant speck in the vast landscape. Remote-sensing shows no aircraft in the area. They change course now and add a few more miles of desert between themselves and the landing site. When the flight path is clear, they ascend vertically at several thousand miles per hour, exiting the atmosphere into space in less than a minute. Soon they will be reunited with the mothership and make their report.

#3 – WHY DO THEY SPIN?

Why do flying saucers often spin lazily while hovering? Neal de Grasse Tyson used saucer spin and the law of angular momentum to ridicule eyewitness accounts. But let’s treat his question —“Why spin at all?”—as if it were sincere and see if we can answer in terms of our model.

To paraphrase my father's July 2004 article for the *MUFON Journal*, "UFOs and Crop Circles, Gravitational Field Common to Both" (p. 9, paras. 3 – 5): *Along with the delay in liftoff because of the length of time it takes to activate gravity control, there is often a rotation of some part of the UFO that increases during the period needed to fully energize the effect. This is to be expected, since the precession of electrons demanded by dynamic nuclear orientation reacts on the vehicle to give it a rotation in the opposite direction, and this must be compensated in some way*. He then notes that a similar effect occurs in helicopters, where the spin is counteracted by the tail rotor.

In order to find further information to provide a more complete answer to Dr. Tyson's question, I searched my father's writings, but unfortunately came up emptyhanded. It would have been nice to provide more depth than the above, but the impossibility of doing so provides an opportunity to illustrate the difference between the UFT and pseudoscientific theories, or for that matter, the general theory of relativity, which is not pseudoscientific, but lacks an operational definition of gravitation, unless one accepts the notion that "curved space-time" amounts to a material force or entity.

The features of a good scientific theory are listed on page 250, but there were a couple of attributes that didn't make it onto the list: a good theory is *visualizable* (i.e., it passes the napkin test[39]), and it is easy to make useful *analogies* with known physical processes. The latter can lead to deeper understanding, further experimentation, and new technological applications. When a theory doesn't meet these criteria, there's a good chance it is flawed.

Eureka! Alien Technology in Your Bathtub

The physical ingredients of our explanation of saucer rotation include precessing electrons in the hull of a saucer at neutral buoyancy in the atmosphere (in other words, enough weight remains to neutralize the buoyancy force determined by the weight of air displaced by the volume of the saucer; see *UFO Riddle #2* above).

Let's see if we can devise an experiment based on this model:

To model the saucer, we will float a plastic serving plate in a bathtub. For the precessing electrons, we will use a gyroscope, a *single* gyroscope: All the electrons in the hull are precessing in the same direction around the same axis, and the sum of all the electrons precessing in any given segment of the saucer is the equivalent of one big gyroscope sitting on a stand on one side of the pie plate and precessing.

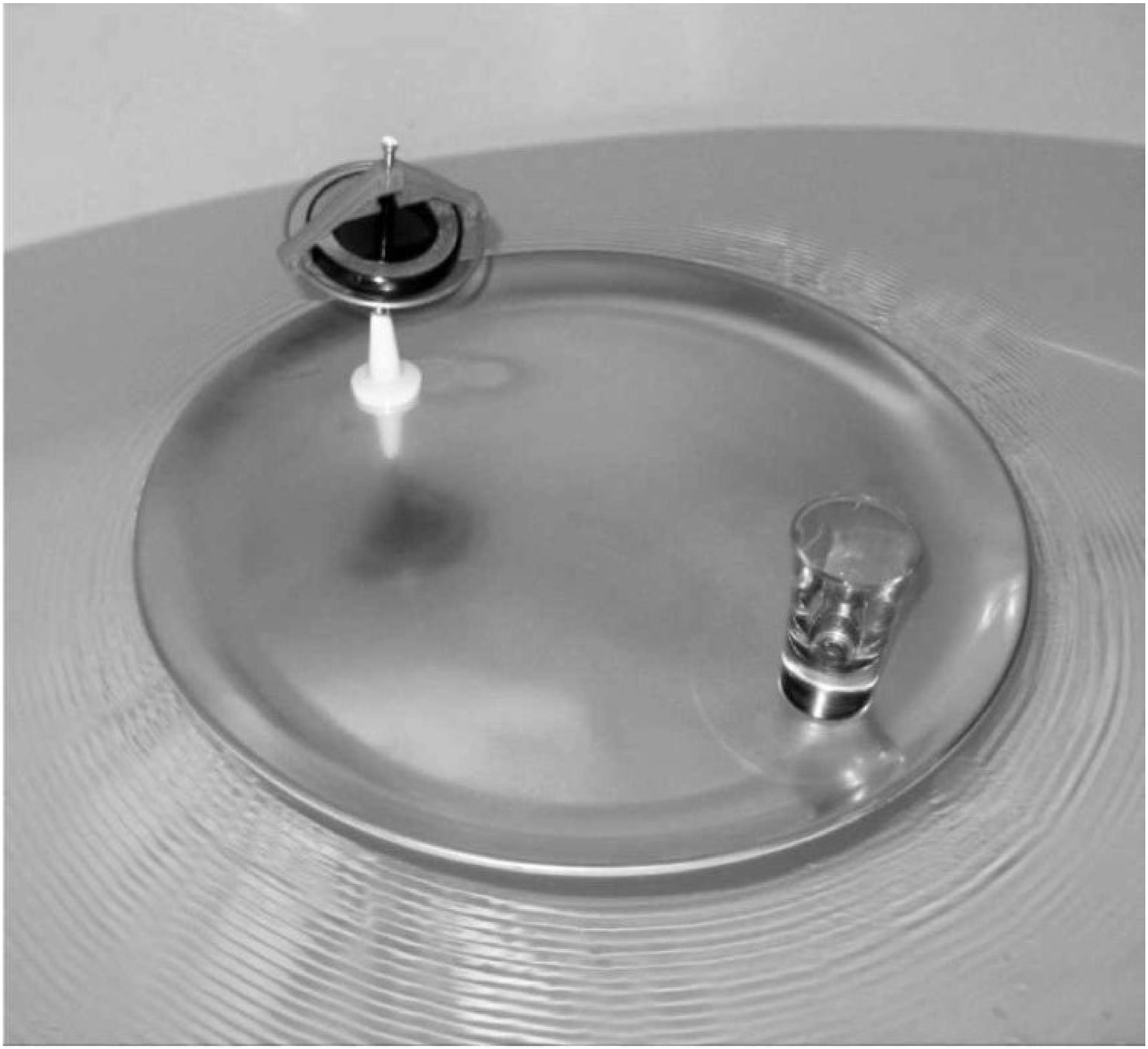
This is an example of a science trick my dad taught me as a child: Blur out the detail in your model and set up an extreme case, such as this, and it will often be most revealing. While it would be difficult to get a quadrillion tiny gyroscopes to sit on a plate and precess around the same axis as if responding to a constant magnetic field (not to mention the sheer cost), a *single* gyroscope can represent the aggregate force of an enormous number of electrons precessing in one segment of the disc. The same thing is going on in all sectors of the disc, so we can ignore them for the time being.

Back to our model: Except for jostling in place due to heat, the aluminum nuclei and their electrons do not migrate about in the metallic matrix in the hull, so we will plant our gyroscope on a stand. A counterweight is needed on the opposite side of the plate to equalize the depth of submersion. The solution: a shot glass.

A shot glass, a toy gyroscope and stand, and a plastic serving plate or a 10” aluminum pie tin: All it takes to model alien technology in your bathtub.

Why are we using *weighted objects* to model a presumably *weightless* vehicle? The quick answer is that the angular momentum is delivered via the *magnetic* moment (*see pp. 213, 214, 234, 239, 257, 258, 289, 290, 344, and fn. 25, p. 112),* and this setup is an adequate model of the effects of the torque delivered by the force.

Below we see the epic experiment in progress. Budget breakdown: plastic platter, $2.97; gyroscope, $8.50; shot glass, $5; water in bathtub, .10 cents. Grand total: $16.57. We urge the reader to try the experiment at home, because there is something about modeling alien technology in one’s own bathtub that words simply cannot describe.



A flying saucer in your bathtub. The gyroscope, representing the aggregate magnetic moment of the precessing electrons, precesses clockwise, and the plate, representing the saucer, rotates slowly in the same direction.

Laboratory notebook entry, September 30th, 2016: The first experiment I designed for this UFO riddle used a ten-speed bicycle wheel with the gyroscope balanced on a spoke. The wheel moved but little and for a while, I thought the experiment was a failure. Then it occurred to me that a floating platter was a far better representation of a hovering saucer, since it was literally floating, the coefficient of friction was virtually nil, and the angular momentum of the gyroscope was large compared to the mass of the plate.

After the tub was filled, I lowered the platter on top of the bathwater and steadied it so that it was motionless. Then I put the shot glass on one side and the gyroscope stand on the other. Finally, I revved up the gyro and lowered it carefully onto the stand, so as not to set the plate in motion inadvertently. The gyroscope began to precess a few seconds after I placed it on its stand.

Even though I knew what to expect, I was astounded when the platter began to rotate clockwise. The movement was slow and stately, exactly as UFO witnesses had described, and not, as Dr. Tyson suggested, like a Frisbee. While the “saucer” and the precessing gyroscope rotated in the same direction, the “kick” that moved the plate occurred when the gyroscope swung in the direction opposite to the clockwise plate movement.

Next, I tried the same experiment with a 10” pie tin. The rotation began immediately, *before* the gyroscope began to precess. The pie tin rotated a trifle faster than the serving plate, possibly because of its reduced diameter, and possibly because it was closer to weightless.

Until the moment the platter began to rotate, the whole experiment had been merely an intellectual exercise. My father had written scarcely sixty words about saucer rotation in the *MUFON Journal*. He had, however, provided a scientific theory that lent itself to a simple experimental test such as this. In designing the experiment, I had followed through on the implications of the theory without thinking much about putting the UFT or the testimony of eyewitnesses on trial.

Archimedes had his “Eureka moment” in a bathtub, and when the saucer began to rotate, just as predicted by the model, I could understand why he leaped out of the water and ran down the street naked. While I managed to curb my enthusiasm, the implication that saucer technology was quite down-to-earth and not magical, or *n*-dimensional physics, or any of the quasi-mystical mumbo jumbo that has crept into modern parlance. Rather, it was a visualizable analogy between physics on a subatomic scale and physics on a Newtonian scale. It beamed with classical beauty and simplicity.

A promise made early in this book was to remove the mystery from flying saucers and transform them into nuts-and-bolts machinery. The bathtub experiment brings home this reality with a directness that no amount of theory can possibly provide. One of the reasons the UFO phenomenon has met with such skepticism is that sightings are relatively rare, while powerful editing software has made it all too easy to cry “Fake!” at any visual evidence witnesses manage to gather.

To date, there has never been anything in the way of a publicly repeatable demonstration of physics in relation to UFOs. The bathtub experiment, however, can be repeated by anyone with the wherewithal to buy a gyroscope, a shot glass, and a plastic serving tray. If you read this book, it will equip you to grasp the implications of this simple experiment, and you will be rewarded with the overwhelming impression of a startling insight into the reality of flying saucers and the way they work. Full confirmation of that insight awaits replication of the 1994 experiment and its results.

Critical Assessment

A prediction was made on the basis of the UFT theory of gravity control technology, and the predicted effect *was* observed, though the direction of rotation was contrary to expectations. The slow rotation of the floating platter matched eyewitness observations of UFO behavior. While these correlations do not constitute proof, they lend support to our model of UFO propulsion and suggest an increased probability of success for a repetition of the 1994 experiment.

The bathtub model constitutes a *qualitative*, not a *quantitative* demonstration of a certain aspect of alien technology. My father stressed that this was what he was seeking in 1994: a qualitative rather than a quantitative test of the technology. While qualitative demonstrations open doors, getting through the door into a new realm of technology requires *quantitative* testing and analysis, and creative engineering adaptations of the results.

The simplicity of the bathtub experiment makes it good for a high school physics class. At the university level, however, the model requires more sophistication.

For example, in our theory of gravity control a microwave pulse travels from the center of the saucer to the edges every few milliseconds, causing the precessing electrons to precess so violently that they flip on their side, like palm trees in a hurricane. A saucer in a bathtub is inadequate to model this feature. Two avenues of investigation are available: computer modeling and laboratory experiment.

But wait, there's more: In dynamic nuclear orientation, the oscillating microwave field adds energy at resonant frequencies to the electrons in the aluminum atoms, causing them to transition to higher energetic spin states. This increases the population of electrons in the higher energetic spin states. How does this affect our model?

The aluminum nuclei must also be considered. When the electrons flip, they orient the aluminum nuclei through interaction with their magnetic moment. The *magnetic moment* is the property of a magnet (a *pair* of magnets in this case, the electron and the aluminum nuclei about which it orbits) that interacts with an applied electromagnetic field (the microwave pulse) to supply a mechanical moment (electronic torque), in this case a coupling between the electrons and the aluminum nuclei, so that the force pulls the nuclei over as the electrons flip. Aluminum nuclei are *paramagnetic*—that is, they respond to the magnetic moment but retain no magnetic properties afterward—and they have a *large* magnetic moment, that is, they interact strongly with the electrons.

How do we model all of these additions to our platter-in-a-bathtub?

And there's more: When the microwave field shuts off after a few milliseconds, the oriented nuclei become disoriented, the flipped electrons stand up again and orient their axes to the constant magnetic field, while precessing around that axis. What happens to our model then?

But we're not done: The properties of inertial mass and gravitational mass are presumably altered with each microwave pulse, but how much? Estimates for the rate of weight removal are given on page 259 and in the 1981 paper (p. 5); *our* question is the effect this progressive change has on our model.

Still another question remains: The relative distribution of particles retaining inertial and gravitational mass versus those whose mass is diminished or nonexistent. Some inequality in those populations can be expected until sufficient orientation has been pumped into the system to negate all inertia and gravitational force. What does this do to our floating pie tin?

In the 2004 *MUFON Journal* article, my dad said, "It is well known that the energy in electromagnetic radiation swirls about the direction of propagation" (p. 9, last paragraph). Does this lead to a kind of a "hurricane vortex" effect, with gravity-neutral areas spiraling outward from the microwave generator at the center of the vehicle in a "cinnamon swirl-cake" pattern? And what does this do to the balance of our flying saucer? Does it cause the entire saucer to precess while it spins, as was observed at China Lake (*p. 139)* and in countless other sightings?

We have gone from a simple model using only a gyroscope and a plastic tray floating in a bathtub —appropriate to a high school physics lab—up to postgraduate seminar in subatomic physics requiring sophisticated computer modeling. That is not the point, however. *All* of our models have two things in common: they are *visualizable* (they pass the napkin test), and they suggest useful analogies with known physical processes. Because of this, our model of gravity control can lead to further insights, new experiments, and new technological applications. The foregoing criteria are simple, obvious, and commonsensical—they were, after all, what sustained the evolution of physical science for centuries—yet no other hypothesis about gravity or UFO technology meets them. Not even close.

If you were to read the 1981 paper with these criteria in mind, you would see that in spite of the mathematical complexity, *the whole of the UFT is based upon exactly the same commonsense scientific criteria*. This lesson in analytical methodology is perhaps the biggest lesson of the bathtub experiment. Whether the analogies on offer are accurate or not, the mere fact that we can make them is important.

#4 – HOW DO THE OCCUPANTS SURVIVE THE G-FORCES?

Newton's first law of motion, sometimes called the *law of inertia*, states that "An object at rest stays at rest and an object in motion stays in motion with the same speed and in the same direction unless acted upon by an unbalanced force." The force required to *alter* the motion of the object, that is, to accelerate it in a new direction, is proportional to the mass of the object. The gravitational force, too, is proportional to mass. Let us note that this is a description of inertia; it is not an operational definition. In other words, it says nothing about the physical origin of inertia.

In the general theory of relativity, Einstein enunciates the intimate relationship between gravity and inertia in the *principle of equivalence*, which states that, in effect, an observer in a windowless room cannot tell whether he is on the surface of the Earth or in a spaceship beyond the influence of any gravitational field and accelerating at 1g.

Airplane pilots (and some passengers) know this firsthand: In terms of physical sensation, it is impossible to tell the difference between pulling out of a steep dive (gravity-influenced acceleration) and cutting a sharp, banking turn at high speed (no gravitational influence). The more violent the acceleration, the greater the force. Modern jet aircraft already test the outer limits of what the human body can stand in terms of inertial force, or "g-force," which simply expresses inertial force as a multiple of gravitational force. If this is the case, how can UFO pilots survive right-angle turns at supersonic speeds or instant zero-to-Mach-3 accelerations? As noted in the riddle, the forces involved would be the equivalent of an exploding A-bomb.

We are now obliged to explain one of the most baffling riddles of UFO flight in scientific terms. We will attempt this in general terms here and refer the reader to further discussions of inertia in this book and my father's other writing.

From the principle of equivalence, the general theory of relativity goes on to ascribe gravity and inertia to the geodesics of space-time. For our purposes, it is enough for us to begin with the well-established observation that inertial mass and gravitational mass are indistinguishable and proportional.

If inertial mass and gravitational mass are equivalent and proportional, then it seems likely that both phenomena originate in the same physical process, and interfering with this physical process, as we do with gravity control technology, will affect *both* gravity and inertia. Years before Jim McCampbell met my father, a similar line of reasoning led him to write, "a 'gravity shield' must also function as an 'inertial shield'" (*UFOLOGY*, first edition, p. 86). At the time, he had no idea how this magic trick might be performed.

The first publication in which my father addressed UFO Riddle #4 was the April 1982 *MUFON Journal*, less than one year after the publication of the AIAA paper. The article was titled "A UFO Propulsion Model." In a sense, the entire text (five pages) is devoted to answering the question, but one paragraph (p. 46, para. 2) addresses it specifically. To paraphrase his words: Since the reduction of gravitational mass by gravity control is a field phenomenon, all mass in the interior and the neighborhood of the vehicle will be reduced, including that of the passengers. Since inertial mass arises from the same subatomic processes as gravitational mass, the occupants will not sense any reaction force during the radical accelerations experienced in flight.

The second mention of UFO Riddle #4 in a popular publication came in the July 2004 *MUFON Journal*, "UFOs and Crop Circles: Gravitational Field Common to Both," page 9, para. 7, available online through the Disclosure Project. Again, the mention is brief, saying essentially the same thing as above in slightly different words: "Since the effects described are due to a field, the inhabitants of the vehicle will also have a reduced mass, and the effect of large accelerations will not be harmful."

Neither of these articles delve into the *physical* origins of inertia. Fortunately, numerous references to the subject will be found in the present volume: *See pp. 201, 215 – 216, 219, 242, 255, 271, 272, 276, 277 (dark matter and), 278, 342, 345.*

Theoretical discussion of a highly technical nature can be found in *Appendix C*, Refs 2, 4, 7, and 9.

#5 – WHY DO UFOS FLY LIKE SKIPPING STONES?

A partial answer to the skipping-stone riddle is contained in the answer to Riddle #4 above: The occupants are not slammed against the sides of the ship as it skitters along at supersonic speeds because the same process that reduces gravitation also reduces inertia. They do not experience g-forces and do not sense the undulating motion, unless they are looking out a view window. It would seem likely that the ship would *not* have a transparent view window, but rather some kind of display screen with a built-in correction for the jittering motion.[40]

But what causes the skipping motion itself? The answer can be found in chart AF0002 on page 299. The two peaks in this chart represent weight spikes followed immediately by weight losses. The weight spike corresponds to the "on" part of the microwave cycle, and the weight loss corresponds to the "off part of the cycle. (*Also see p. 299 for visualization of microwave pulses used in the experiment*.)

When the microwave field switches on, it drives the precessing electrons in the aluminum hull so violently that they flip over *en masse*, causing the aluminum nuclei to flip with them. During the "driving" part of the cycle, interaction with the Earth's gravitational field *increases* and the weight of the vehicle also increases. When the microwave field shuts off, the Earth's gravitational field loses energy and the weight of the vehicle decreases. Each on/off cycle leaves residual orientation of aluminum nuclei. As the orientation accumulates, the weight of the saucer begins to plunge.

However, as you can see from the chart, each "on" cycle is accompanied by momentary weight gain. This is the source of the saw-tooth pattern in the chart and the undulation in saucer flight. The more power the saucer can emit, the more orientation will be stored and the smoother the flight path.

Corroborating evidence that this is indeed the technology used by saucers comes from the "key sighting" described in *Chapter 18*, which included the exact timing of microwave pulses emitted by the craft. Still photographs of UFOs in motion are another source. Since the on/off cycle required for dynamic nuclear orientation is on the order of milliseconds, a single photographic exposure of a UFO in motion may embrace several cycles, which may represent a reverse-engineering opportunity: If we know the exposure time, we can estimate the duration of each *part* of the on/off cycle.

My father did this calculation with a photograph snapped in the desert while a UFO was making a vertical takeoff as an emergency evasion. When the photo was developed, the photographer was surprised to see multiple images of the saucer in a single exposure. This led to conjecture that the UFO was an interdimensional entity.

Fortunately, the exposure time was given for the photograph. Dividing the exposure time by the number of images revealed that they were separated by a few milliseconds, which suggests that the images were captured during hesitations in the ascent due to the build-up of gravitational/inertial mass during the “on” part of the cycle predicted by the theory. It was even possible to determine that the orientation (“on” or “driving”) part of the cycle was applied for much less time than the relaxation (“off”) part of the cycle.

Engineers should have fun with this photo, if they can get their hands on it.[41]

#6 – WHY ARE THE ANDES A UFO HOTSPOT?

While I was visiting Oregon in 2005, my dad put this to me in the form of a UFO riddle: “Why are UFOs seen flying north and south along the Andes ridges so often that the government has put up a plaque saying, ‘Wave to our space visitors’?” He gave me a day to mull it over, and when I came up emptyhanded, he offered the following commonsense explanation:

As organic beings, the aliens don’t like ionizing radiation any more than we do. Unfortunately for all concerned, earth is surrounded by a dense cloud of radiation called the Van Allen belt. The Van Allen belt is relatively thin at the Poles, however, so the aliens are simply minimizing their exposure by entering the Earth’s atmosphere over the polar regions, where the Van Allen belt is thinnest. Antarctica is where they are least likely to be observed or interfered with by the military. From there they can head north or south along the Andes, which make a great visual reference point for navigation.

From the northernmost tip of the Antarctic Peninsula to the southernmost peaks of the Andes at Tierra del Fuego is a short hop of 620 miles across the deep blue waters of Drake Passage. For a UFO traveling 5,000 mph, the transit would take around eight minutes. From Tierra del Fuego, the Andes form a virtual highway to travel to or from Mexico or the United States. The Andes offer safety of another kind, too: The remote and sparsely populated ranges are not blanketed by radar like the densely populated coastal areas, reducing the possibility of detection by military or civilian observers. Nor are squadrons of fighter jets waiting to pounce on interlopers in the Andes region.

If the alien cosmonauts require more discretion, they can dive under the radar and thread their way through the relatively uninhabited valleys of the Andes. Or they can touch down for repairs, take on water from a mountain lake, or park and stretch their legs. The possibility of being molested in such remote areas is almost nil, as the natives, such as the grateful residents of San Clemente, are generally unarmed and friendly.

This combination of attractions is probably what has made the Andes an extraterrestrial highway. But, the Van Allen belt is also thin over the North Pole, so wouldn’t sightings be just as common there? The Arctic is a different kind of neighborhood. NORAD, the North American Aerospace Defense Command, blankets the region with radar and satellite surveillance. NORAD’s Russian counterpart is equally busy. The October 26, 2016, *Siberian Times* quotes Russian Defense

Minister Sergei Shoigu promising “full radar coverage of the Arctic” by the end of 2014, two years ago. The Russians are predictably tightlipped, but what about NORAD? Have they ever detected a UFO?

“Never,” is the official line, which is daunting but not unexpected news for UFO researchers. However, in the 1970s I had a chat with an ex-NORAD radar operator who described how it felt the first time an incoming UFO lit up his radar screen.

He had just reported for duty at an Arctic radar installation sometime in the 1960s when he saw the craft descending vertically from deep space directly over the Pole at roughly 5,000 mph, announcing its presence with a loud ping, a clear indication of a metallic object of considerable size. That alone was enough to make the alarm bells go off in his head, but in addition, its flight path included zigzag turns completely unlike an incoming missile, aircraft, or meteor. He immediately alerted his superior officer, who hurried over to his station and bent over the screen. They both watched as the object leveled out and headed south across Canada at a hypersonic clip.

After the bogey was gone, the CO congratulated the operator on spotting his first “visitor,” and told him to write up a report on a special form which was to be deposited in a special bin separate from all other paperwork.

“Where does it go from there?” the operator asked. “Above your pay grade,” the CO answered curtly and left. So, as the witness explained, when NORAD says, “No UFOs,” they mean “None—*on our records,”* which was true, because the reports were filled out on a non-departmental form and routed to a different agency. This avoided messy public inquiries that would interfere with their *real* job: defending against missiles or bombers arriving by the polar route. And who can blame them?

The witness went on to say that he had logged numerous “visitor” incidents during his term of duty, all of them arriving and departing from deep space, which lends credence my father’s theory that the North and South Poles are preferred entry points because of reduced risk of radiation exposure.

It is interesting to note that according to the witness, the aliens were never treated as hostiles. Their comings and goings were duly logged, and that was all. However, this may have been a case of making a virtue out of necessity, owing to the futility of attempting to intercept highly maneuverable, hypersonic flying discs with fixed-wing aircraft. It is difficult to believe that NORAD or the Air Force would be *wholly* indifferent to unknown spacecraft violating sensitive air space with impunity.

In 1953, the CIA-commissioned Robertson panel, which included, among others, distinguished scientists Dr. Luis Alvarez and Dr. J. Allen Hynek, affirmed Project Blue Book’s conclusion that UFOs, whatever they were, were *not* a threat to national security. The Air Force later convened the Condon Committee (1969), whose main job was to give the Air Force a reason for canceling further investigation of UFOs, at least “on the record.”

If the anecdote given above is true, it reveals two things: By the early 1960s, long before the Condon Committee, the Air Force did not view UFOs as a threat, and was no longer seriously studying the phenomenon, as it had little to do with their national defense mission. Perhaps in some smoke-filled room at the Pentagon, someone projected reports filed by our NORAD operators on a screen and pointed out that the zigzag flight path *itself* may have no other function than a signal, declaring, "Hey, this is *not* an incoming missile! Don't go all crazy and start World War III!" At any rate, this anecdote suggests that by 1969 the responsibility for investigating UFOs had been turfed to another agency whose mission was not known to the public, and whose data remained secret.

After Timothy Good's 1988 book *Above Top Secret*,[42] none of this comes as any surprise. It just adds a little focus to a fuzzy image. Pressing further leads us into the speculation business, which we've sworn to avoid. The foundation is rather flimsy, as it is only one witness's uncorroborated account, and perhaps he was just telling a tall tale, though for what reason I cannot imagine. As this book is dedicated to tangibles and measurables, we must turn the page to a new riddle.

#7 – IS THERE A CONNECTION BETWEEN UFOS AND CROP CIRCLES?

A richly detailed answer to this question can be found in my father's July 2004 *MUFON Journal* article, "UFOs and Crop Circles—Gravitational Field Common to Both" (viewable online, thanks to the Disclosure Project). Even though the article described the technique of crop-circle formation in enough detail to permit a couple of electrical engineering graduate students to duplicate it as part of, say, a master's thesis project, no-one seemed to read between the lines and accept the challenge.

Similarly, human beings may be failing to "read between the circles" while they obsess with deciphering the ever-more-elaborate geometrical formations woven into the grain. My father's analysis paralleled Marshall McLuhan's famous aphorism: *The medium is the message*. That is, the crop-circle-makers—excluding hoaxers, such as the notorious Doug and Dave—are giving us a direct demonstration of gravity-control technology and leaving enough clues behind to allow us to figure it out for ourselves. (Please do not ask why the aliens don't publish in a refereed journal instead. My father's experience suggests their submission would be rejected without comment.)

Here are seven crop-circle riddles answered. They are really just highlights from the 2004 article, edited down to "teaser" level. *(Page numbers refer to the MUFON article*):

* Crop Circles: Ql *

Q1: *How are crop circles formed? How do they form so quickly? The time it takes to complete all 400 component circles of your 800-foot-in-diameter masterpiece will be ten to fifteen seconds. At least, that's what witnesses who've seen the circles form say. Maybe they were drunk or deluded. What do you think?*

A1: The same technology employed in reducing the effect of gravitation on a flying saucer is used to increase gravitation over an area of a field. Crop-circle formation emphasizes the “driving” part of the on/off cycle described in the answer to Riddle #5 and elsewhere in the text. Presumably a magnetic field is projected, and then a powerful burst of microwave energy. The stalks of grain are flattened and swirled by the burst, which is transmitted vertically downward from a UFO hovering at high altitude above the target area. The pulses last only a few milliseconds, and for good reason. Microscopic particles of iron are found in genuine circles (see Q5 below), melted by high heat, a probable side effect of the microwave pulse(s). Iron melts at 1535° C. The minuscule size of the particles and the brief duration of the pulse keeps the crops from catching fire.

The process is relatively simple and could easily be duplicated by any experimenter who understood the technology described in this book. It is possible that a microwave oven, properly reconfigured, could produce enough energy to form small crop circles.

* Crop Circles: Q2 *

Q2: *Why circles?*

A2: Energy in electromagnetic radiation swirls about the direction of propagation. In crop circle formation, a combination of a magnetic field and a microwave pulse is presumably projected downward from a UFO hovering above the field at high altitude. The direction and layout of the swirling action inside a crop circle indicates symmetry about a vertical axis, which mirrors the action of an electromagnetic field projected from a point high above the crop circle, (*p. 9, last paragraph)*

* Crop Circles: Q3 *

Q3: *How much energy does it take to form a crop circle, and why is this a clue to the (alien) rationale for the whole phenomenon?*

A3: An average crop circle requires megawatts to form. Onboard reactors in UFOs apparently generate much more energy than required to keep the craft weightless. Crop circles represent an inspired way to use the excess energy for communication in a medium that cannot be ignored, though skeptics and debunkers have devoted considerable time and energy to labeling the phenomenon a hoax or, laughably, the result of fungi or wind. A measure of skeptics’ (there seems to be a small army of them) devotion to diverting public attention from the probable origin of the phenomenon and scientific investigation of it was inadvertently discovered when a search for data on the number of crop circles in southern England returned page after page of stories “scientifically” debunking the phenomenon and nothing else. Mainstream media seems to have an insatiable appetite for skeptic arguments and very little for rebuttals. Is this a policy directed from higher up, or is a skeptical bias native to journalistic thinking? *(p. 9, paras. 8, 9)*

* Crop Circles: Q4 *

Q4: *Beams of light have been seen coming down through clouds at the same time the circles form. What's going on there? Or is it just too much whisky and a mass hallucination?*

A4: Since 60% of crop circles form in rainy weather, it is possible the UFOs are using the cloud cover to avoid being seen from the ground. Clouds and rain do not impede microwave projection, but the large amount of energy involved would cause the atmosphere to glow. Witnesses report seeing columns of light descending through the clouds at the same time the crop circles appear. *(p. 9, para. 10)*

* Crop Circles: Q5 *

Q5: *Airborne orbs (small, metallic spheres) are often seen skimming the fields just above the tops of the grain before the circle forms (videos of orbs in action appear on YouTube). What are "orbs, "and what role, if any, do they play in creating the formations?*

A5: The orbs are likely drones seeding the field with iron nanoparticles that assist the driving of electrons at ground level (p. 9, paras. 13 – 15). Unlike in the gravity-control propulsion system used in a vehicle, crop circle formation does not require accumulation of nuclear orientation. Once the field is seeded with iron particles and caused to precess, a microwave pulse of a few seconds or less is enough to create the formation. Any longer might heat the crops enough to set them on fire. The crop circles would form in a matter of seconds during the energy flood from above. Stunned eyewitnesses report that this is exactly what happens: swathes of grain lie down in geometric patterns almost instantaneously. But this "miracle" is the end result of a detailed preparation process.

* Crop Circles: Q6 *

Q6: *Dead animals are seldom found inside the circles. When they are, the corpses have been flattened as if squeezed in a hydraulic press. Why?*

A6: The pulse that forms the circle may be preceded by "warning" flashes (sonic or electromagnetic) that cause animals to panic and flee the area. If an animal is caught in the burst, it will be crushed by intense g-forces. Birds have exploded midair (1993), and in Canada, a porcupine was flattened, its quills swirled in the same direction as the crops. Rather than fleeing, porcupines prefer to hunker down and brandish their quills when threatened. Flies caught in the blast were fused to the seed heads by their tongues. Other flies exploded. The degree of damage to the bodies of animals, including cellular damage caused by microwave radiation, can be used to learn more about the forces and energy involved in crop circle formation. (*p. 9, para. 12)*

*** Crop Circles: Q7 ***

Q7: *Why do the crop-circle crafters seem to prefer fields in the general vicinity of Stonehenge? Are they druids? Or is the vicinity rife with hoaxsters with time on their hands?*

A7: Nothing religious, pagan or otherwise, about it. Stonehenge and other areas that have a lot of crop circles also have mineral-laden water below the surface, which would heighten the reflection of the incident radiation, amplifying the effects required for crop circle formation. (*p. 10, para. 1*)

#8 – CAN YOU EXPLAIN THE SPARTAN INTERIOR OF A UFO?

We have been building a rounded portrait of alien propulsion technology that will enable us to answer this riddle. First, let's review the preceding riddle revelations:

Riddle #1 discussed the of the classic "flying saucer" shape that characterizes so many UFOs. It was found to be similar to two ideal radar antennae clapped together like clam shells, forming a saucer. Each sauce serves as a wave guide to transmit pulsed microwave radiation or nuclear orientation, or both, to the hull.

Riddle #2, "What's holding them up?", analyzed various puzzling aspects of the propulsion system, such as the combination of a gravity control, whose primary function is simply to relieve weight and inertia, with other forms of locomotion, such as low-powered rockets or electromagnetic drives. Silent hovering is no mystery: The ship displaces enough air to make it buoyant when sufficient weight is removed by gravity control. Instant takeoffs are provided by the electromagnetic drive, which is soundless and operating against a vehicle with zero mass. The saucer exits into space without any resistance from the Earth's gravitational field, and inertia is reduced to zero, so the acceleration can be lightning fast or as lazy as a hot air balloon, as witnesses report.

Riddle #3, "Why do they spin?", discussed why saucers rotate slowly while hovering.

Riddle #4 explained why the violent accelerations characteristic of UFO flight do not harm the occupants.

Riddle #5 continued the analysis of the erratic motion that characterizes UFO flight, including the "skipping stone" motion in flight and hesitations during takeoff revealed by multiple images of a UFO in a single photographic exposure.

All of these features are reflections of a single underlying technology: gravity control. When it comes to the spartan interior of the craft, the now fairly complete portrait provides an easy explanation.

The main components of a flying saucer are simple. Moving parts are almost nonexistent: The hull is a wave guide, two radar antennas clapped together to form a flying disc. A central reactor powers the gravity-control effect. Propulsion and directional guidance is provided by pivoting electromagnets in the lower level of the craft, with some possible backup by low-powered rockets, air jets, or fans. The reactor core is a bit of a mystery, but it's safe to say that the aliens have found a way to generate a great amount of power (in the range of a diesel locomotive) in a small space.

As for spartan flight controls, Col. Corso reported that reverse-engineering soon disclosed that circuitry was embedded in the material of the saucer.[43] According to Corso, this realization led to the development of the solid-state integrated circuit that has powered the revolution in computer science and telecommunications in our time. It would not be surprising to find that integrated circuitry and computing capability was engineered down to the molecular level in the hull of the craft, too, which would help account for the lack of equipment racks, handles, levers, and pipes on the interior.

The exact nature of the interface between the occupants and the ship is not known, but it's safe to assume that it has followed the same path of miniaturization and integration shown in the design of the rest of the ship. In other words, it would not be surprising to find that there was a direct, embedded interface between the EBE (extraterrestrial biological entity, visitor, space brother, Zeta Reticulan[44] or what have you) and the ship itself. This would explain the lack of instrumentation and controls.

The latter line of thought is purely speculative and leads us further and further into reliance on witness testimony. Fortunately, we already have enough of a nuts-and-bolts understanding of the gravity-control propulsion system and exemplars of miniaturization and integrated circuitry to explain every aspect of UFO design, from the spartan interior to the architecture of the hull, including the basic saucer shape and the many alternate variations on axial symmetry, including equilateral triangles.

#9 – THE NOBEL-PRIZE-WINNING QUESTION

The law of conservation of energy—i.e., energy can neither be created or destroyed—is the law that makes perpetual motion machines impossible. Does antigravity violate this law? The patent office apparently thinks so, because it classifies antigravity patent applications in the same group as perpetual motion machines. Is the patent office correct? Where does the kinetic energy stored in an object elevated while weightless come from?

I was pretty sure that my dad would have an answer to the professor's thermonuclear, UFT-destroying question, but I was wary of asking. What if he *didn't* have one? Might I get caught in the crossfire between two fulminating physicists? It took me about two weeks to screw up the courage to ask. When I did, I told my dad that a physicist friend had asked it. I left out the part about throwing the paper, the rabid-dog, frothing-at-the-mouth effect, and the contemptuous "Get back to me" remark.

The answer was short and to the point. "Your friend apparently doesn't know the difference between an *open* system and a *closed* system. If it had been a *closed* system in his example, he would have been right. But it's not—it's an open system, and you're allowed to move energy around in an open system without violating the conservation of energy law. That's all."

I hope I have transcribed his words properly; the conversation took place roughly thirteen years ago and there was no written record. He didn't see fit to amplify beyond that, though I did find a page in his notes, probably written in the 1950s, on the promising research being done in open (vs. closed) systems, so he was well-prepared to field this question.

To corroborate his answer, I turned to Wikipedia. There I found that the law of conservation of energy states that the total energy of an *isolated* (i.e. *closed)* system is constant. Energy can be transformed from one form to another, but it cannot be created or destroyed. Later, it *explicitly* limits the scope of the law to "a *closed* system." No energy is added to the system when the sack regains its weight. The gravity "shield," which is bought at a price (energy invested), is dropped, the sack again interacts with the Earth's gravitational field, the weight returns to normal, and it falls with *x* kinetic energy.

The professor's thinking reflected his intuitive and unexamined feeling (shared by most everyone) that weight is an intrinsic, immutable property of mass. However, in the UFT, weight is viewed as an *effect* of subatomic physical processes. Altering these processes alters the weight of the object by decreasing its interaction with the Earth's gravitational field. Because of gravity control, "weight" is no longer an intrinsic property of mass.

I attempted to reach the professor to give him his answer, but the chess cafe had closed its doors and he didn't answer my email. I never saw or spoke to him again. The episode had two kinds of value: The answer itself was one. Second, it confirmed all the stories my father had told over the years of bizarre temper tantrums thrown by physics professors upon encountering the UFT.

I had experienced the tendency among physicists to refuse to read the paper, which was often accompanied by a condescending chuckle, or an immediate change of subject to some new theoretical branch of general relativity. I had seen the tendency to run away or hide behind irrelevant topics, but I had not yet seen the full-blown, vein-bursting, trembling, apoplectic fit that my father had often described. I had assumed that he was exaggerating, probably because he was bothered by the lack of respect accorded the UFT, but now, thanks to this episode and another (not described), I knew for sure it was *true—all* true, without any exaggeration whatsoever. None. The mere *mention* of the ideas in the UFT was enough to drive *some* physics professors completely bonkers. Others simply fled. And yet, these brilliant professional scientists were the same "impartial experts" routinely charged with evaluating the papers my dad submitted to the top-tier journals.

It was a staggering revelation, far weirder and more inexplicable to my way of thinking than the existence of UFOs.

#10 – WHY DO CAR ENGINES AND HEADLAMPS SHUT DOWN?

Interference with internal combustion engines has been noted in connection with the presence of UFOs as far back as the 1960s, when the Air Force-funded Condon Committee (1966-1968) placed it on the agenda of items to be debunked—correction, *investigated*. On the theory that a magnetic field was somehow responsible for shutting down the automobile's ignition system, the Committee dutifully subjected an automobile ignition system to magnetic fields of varying strength. Not surprisingly, they found that in order to interfere with the ignition system, the field would have to be so strong—20,000 gauss—that the car would have permanent magnetic side effects after the field was shut off. No such effects were found in an automobile allegedly shut down by a UFO, and the Committee, in its wisdom, concluded that the car had never been subjected to a powerful magnetic field, and moved on.

The implication, of course, was that the car had shut down for reasons having nothing to do with a close encounter with a UFO. At the same time, the Committee was in possession of a report (Case No. 5) showing that intense, *pulsed* microwave bursts were intimately tied to UFO propulsion (*see p. 109*). Due diligence would have dictated that the Committee start with pulsed microwave fields, rather than a brute force magnetic field—which is yet one more reason why the Committee "investigation" reeked of rigging the evidence to support a foregone conclusion ("UFOs don't exist and witnesses are deluded"), while sidelining evidence that might lead to an inconvenient truth. Some governments, such as Belgium, readily acknowledge the existence of UFOs. Others are equivocal about it. But for some reason the U.S. government has gone to extraordinary lengths to deny the reality of the phenomenon, creating a "credibility gap" wide enough for a couple of side-by-side eighteen-wheelers.[45]

In *UFOLOGY* (*fn. 24, p. 109*), Jim McCampbell pursued the matter in a different way: by gathering evidence and letting it lead him toward the truth, whatever that might be. And by "truth," of course, we mean "consistent with physical law" and "experimentally verifiable."

Jim begins by noting that radio and headlamp interference and engine shutdown strongly indicate an electrical or electromagnetic cause. Any doubt, he says, is removed by a 1954 case in Italy where a UFO flew over a diesel tractor running side-by-side with a conventional tractor. The conventional tractor shut down and the diesel tractor kept on running. Another interesting case from 1969—cited by Edward Condon, no less—concerned a driver in England whose headlamps and radio shut down while his diesel-powered engine kept running. Diesel, of course, depends on compression of a mixture of fuel and oxygen. Conventional engines depend on magnetic coils and a timed ignition system.

Recalling Condon Committee Case No. 5 (*see p. 109*), McCampbell notes that "high frequency electromagnetic radiation is an excellent candidate for the cause of UFO interference with cars." An ignition coil consists of an iron core surrounded by two coils of copper wire. The primary winding has relatively few turns of heavy wire. The *secondary winding* consists of thousands of turns of thinner wire. The pulsed microwave radiation might induce high-voltage surges in the secondary winding, which could throw off the timing of the sparks in the cylinders. Since timing is critical, this could be the mechanism of the shutdown. It would be interesting to see if modern electronic ignition systems also shut down in the presence of UFOs.

As for car radios, high frequency microwave bursts could cause static, or, as McCampbell suggests, "saturate the input circuitry, thereby blocking its normal reception." He also cites a 1957 sighting in which a Canadian reported that his battery-powered AM radio failed in the presence of a UFO, but his portable shortwave radio emitted a single tone on one shortwave frequency. Police radios have emitted sounds such as *"dit-dit-dit,"* a "loud beeping," or *"dot-dot-dash"* in the presence of a UFO.

What might explain why an AM radio would shut down, but shortwave and police bandwidths would generate sound effects? What was the frequency on which the Canadian's shortwave emitted the single tone? These questions might be the beginning of a useful inquiry, but they were not pursued by the Condon Committee.

What about headlamps? Until the 1960s, headlamp filaments were made of tungsten. Luminosity was improved with the introduction of tungsten-halogen (also called "quartz-halogen") technology in 1962, but tungsten remains a primary source of incandescence. Microwaves increase resistivity in tungsten, and if the field was strong enough, it might decrease heating in the filament, which would dim the bulb and eventually shut it down. It is not known how fluctuations in the field influence the effect. Distributor points, too, are made of tungsten alloy, and increased resistivity here would interfere with spark production. Distributor caps are nonmetallic, which means the distributor assembly isn't shielded from microwave interference.

Jim McCampbell continued to speculate about the engine shutdown riddle in a letter to my father dated November 23, 1981. The letter, which was penciled by hand on ruled legal-pad paper, read as follows (see below):

The following thoughts represent an advance over my perception of the past few years, both theoretically and regarding a small number of UFO events. A newly reported automobile interference case provides a clue. You will find it in the new book by Ray Fowler, Casebook of a UFO Investigator.[46] *(Ray is a colleague on the Board of Directors of MUFON and the principal contributor and editor of our Field Investigators Manual.)*

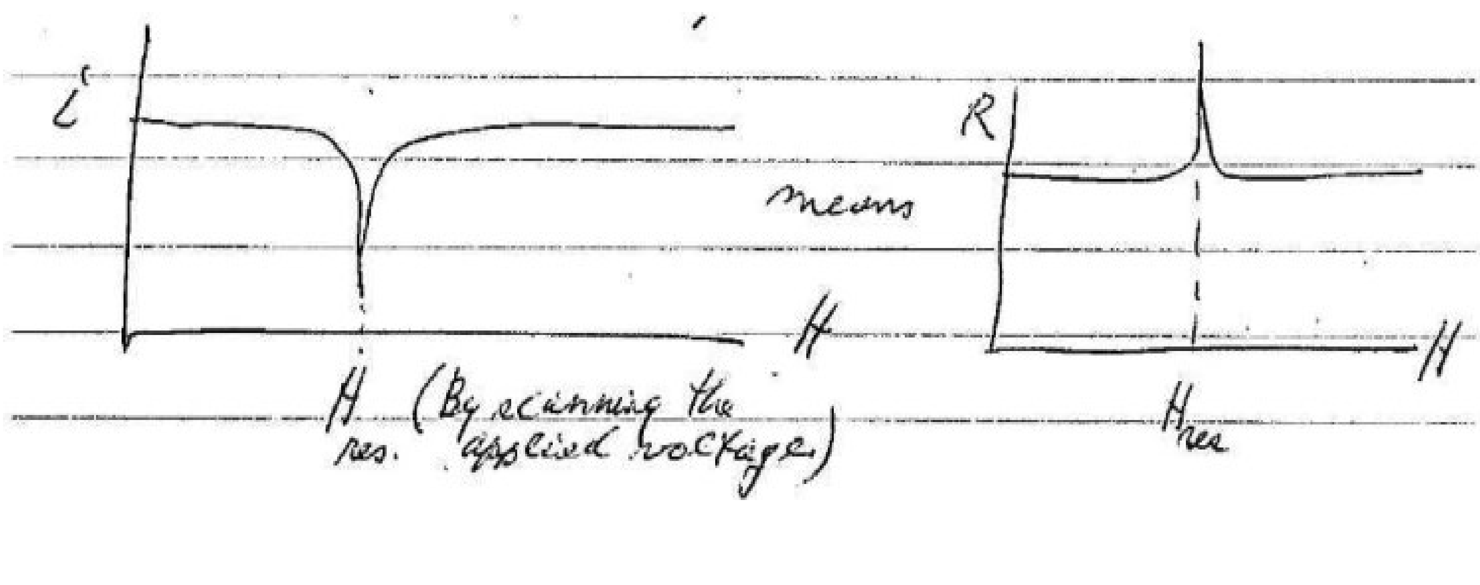
Case: Typical car-stop with the UFO close-by but not directly ahead. The headlights remain on, indicating continued power from the battery. He tried to start the car without success. The engine would not turn over. After the UFO departed, he had no trouble in starting the car. (The battery was still in good shape.) Clearly the problem was in the starter solenoid. Because of previous instances like this, I purchased, a year or so ago, a typical replacement part and made some measurements on it. Recently, I wrote to the manufacturer, who kindly answered my technical questions about the unit and furnished their design drawing. In summary, I know the *resistance of the solenoid, the normal current, the geometrical details, the number of turns, the strength of the restoring spring, the minimum voltage to operate, etc. From this I calculate the operating magnetic field strength at about 6000 oersted.*

It appears to me that, in these events, the solenoid itself operates properly by closing the connection to the starter. Sufficient current to turn the starter over, however, is prevented by an increase in resistance of that component of the switch that is exposed to the magnetic field from the solenoid.

I suspect that the answer lies in electron paramagnetic resonance of the conduction electrons in that component. Do not be concerned about the limited penetration of microwaves into metal and ignore the drift of electrons comprising the current. Their basic behavior exposes them to the microwaves as they approach the potential barrier at the surface and rebound, with a long mean-free-path, toward the interior. They would resonantly absorb energy from the microwave field if their frequency of precession in the applied magnetic field was the same as the frequency of the microwave radiation impinging.

My calculations indicate that the resonance would be at 30,000 [Ed note: 3000?] *MHz for the solenoid field described above. That corresponds to a wavelength of 1 cm, where all the indications of my studies focus. (At the moment, I can't put my hands on the calculations, but I believe* H_0 *was about 6200 oersted. Would you care to check this?)*

A simple experiment is obvious. Since [illegible symbol] ∞H_0, *we would have to have access to a 1-cm, pulsed source. But we can tune the experiment to more available* μ*-wave sources, such as ovens (not pulsed) or police radars. The applied magnetic field can easily be reduced to the desired value for the frequency of these sources, about 2400 MHz: <u>Problem!</u> The reduced voltage on the solenoid to produce the correct* H *will not operate the switch. <u>Solution:</u> Take the unit apart, remove the restoring spring, reassemble, and clamp the switch closed! Then scan* H *around the expected point of resonance while measuring the current carried in the starter circuit or the* iR *drop. Either measure can be extremely sensitive. Expected, or possible result:*



Jim McCampbell's drawing (1981)

The basic mechanism for increasing the resistance I believe to be the removal of conduction electrons by their being swallowed by the lattice ions into unfilled orbital states (Mott scattering). The material involved must be a transition element. That is the one fact I do not have regarding the starter solenoid and I will ask the manufacturer and get a metallurgical judgment from the unit I have.

I cannot help but feel that these thoughts have something to do with your theoretical approach to anti-gravity. If it makes sense to you, we should probably include this "poor-boy" experiment in the early part of the larger program. If it produced the expected results we would have

a) A measure of the frequency of μ-waves emitted by UFOs (very precise), and

b) Evidence of a physical phenomenon that, to my knowledge, has never been observed.

The discussion of ignition shutdown ends here.

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32 *Reasons for preferring pure aluminum as a construction material are given throughout the book and the references listed on p. 347. Zamora's description, which is echoed by the majority of witnesses, provides yet one more point of corroboration between the observed characteristics of UFO technology and my father's theory,*

33 *This suggests that the coveralls were made from material similar to the hull. In his 1982 MUFON Symposium paper (p. 45, paragraphs 3 – 5), my dad suggested aluminum in the fabric of uniforms would have a twofold purpose: conducting nuclear orientation and shielding the occupants from microwave radiation.*

34 *Published in James W. Moseley's newsletter,* Saucer Smear, *in 1983, p. 323 - 324. Princeton-educated Moseley (1931 - 2012) published* Saucer News *and its successor,* Saucer Smear, *which together became the longest running UFO journal in history. Moseley was a dedicated skeptic/debunker, but maintained that once the misidentifications and hoaxes were stripped away, the UFO phenomenon was real, but in need of a credible scientific explanation.*

35 *fn. 21,p. 105*

36 *Calculations from Jim McCampbell's* UFOLOGY.

37 *Nothing in Lazar's account provides a clue as to how electrons in the hull of the saucer are made to precess, or even* if *they are, as it is possible to conduct nuclear orientation from the core of the craft to the hull by "wires" built into the hull itself. In the absence of evidence, we shall refrain from speculating.*

38 *Mercury has a weak magnetic field.*

39 *My dad used to say that any good idea in physics should be communicable with a few sketches on a paper napkin. The "napkin test" exists in business, but I haven't heard anyone else mention it in connection with physics.*

40 *See "A UFO Propulsion Model,"* MUFON Journal *April 1982, p. 46, paras. 1 and 2. Also references to inertia cited*

above, and the 1981 AIAA paper, p. 4, para. 2.

41 *Unfortunately, the photo could not be located on Google Images. The source was almost certainly Adrian Vance*, UFOs, The Eye and the Camera, *Barlenmir, 1977; ISBN-13: 978-0879290467; ISBN-10: 0879290463. Amazon had 19 used copies available at the time of the first printing of* How to Build a Flying Saucer.

42 *Used copies were available for one cent on Amazon at the time of this printing.*

43*fn.21,p. 105*

44 *Zeta Reticuli is a binary star system 39.5 light years from the sun and visible only in the southern hemisphere. The tandem stars are 0.6 light years apart, and both are similar to our sun. In the 1960s, Tennessee schoolteacher Marjorie Fish discovered a similarity between the Zeta system and a star map drawn by UFO abductee Betty Hill in 1961, and Zeta Reticuli quickly entered the literature as the home of the "grays," the alien beings most frequently reported by UFO witnesses. Tantalizing evidence has since emerged that Zeta 2 has a planet orbiting in its goldilocks zone, but astronomers later rescinded that judgment. Zeta 2 was also determined to be too young to allow for the evolution of intelligent life. The jury is still out, as better data may change our idea of this star system and its planets, if any. As for the "grays," it seems that they're here to stay, regardless of where they might or might not come from.*

45 *Ed note: Not that it will make any difference to decision makers in high places, but as anyone knows who's ever been part of a social group or a family, a "credibility gap" can be, and usually* is, *far more damaging than the unvarnished truth, and, as Shakespeare warned, the longer a lie is maintained, the more difficult it becomes to disengage from the tangled web we weave. At the end of World War 11, faith in government was high. Not surprisingly, the innumerable deceptions promulgated from 1963 to the present day have fooled very few people and have instead done immeasurable damage to that faith, upon which these agencies depend for legitimacy.*

One can only hope that the advent of gravity-control technology and its mainstreaming through space exploration and private transportation will greatly speed the process of disclosure and acceptance, ending once and for all this destructive chapter in U.S. history.

46 *The book is probably only available in libraries now, as none were found on the Web. Fowler has written ten books. His latest is* Synchrofile – Amazing Personal Encounters with Synchronicity and Other Strange Phenomena, *published in 2004.*

Chapter 25

HOW TO BUILD A FLYING SAUCER

INTRODUCTION

My father always viewed saucer development as a three-stage process:

Phase 1 – Prove that gravity control technology works. He believed the 1994 experiment did this.

Phase 2 – Obtain funding for development of a small-scale, prototype saucer, probably a drone. My father estimated that this phase would take about a year. Based on Silicon Valley experience, I would say two to three years is more like it. Research at the beginning of Phase 2 is likely to consume at least a year and millions of dollars. The most energy-efficient method for producing the gravity control effect and communicating it to the hull must be found. Only then can the problem of the onboard power plant, and the propulsion and guidance systems be addressed. However, funding for this phase will be easy to find after successful completion of Phase 1.

Phase 3 – Build a fully-manned spaceworthy flying saucer. Funding would of course depend on successful completion of Phase 2, but the demonstration of a flying drone would make it easy.

Beyond the horizon of Phase 3 lay the reshaping of civilization, accompanied by space colonization and mining, new forms of public and private transportation, and the redesign of urban infrastructure.

In researching *How to Build a Flying Saucer*, I was surprised to find an *eleven*-phase breakdown of saucer development among my father's papers. It was, however, written in 1981, so the first eight phases may be considered to be subsumed by the events of 1994.

PROJECT TO BUILD A SPACE VEHICLE USING GRAVITY-CONTROL PROPULSION

17 Nov 1981

The plan is divided into eleven phases:

1) In the first phase, there will be a review of the literature for values of parameters which will be relevant to the experiments, as well as the methods of dynamic nuclear orientation, experimental as well as the theoretical aspects. In addition, in the first phase, the present state of study of virtual processes will be reviewed for whatever aspects are relevant to this study.

2) In the second phase, the experiments and apparatus designs will be formulated.

3) In the third phase, hardware will be specified and lists of apparatus required will be compiled.

4) In the fourth phase, orders will be placed for the procurement of the necessary equipment.

5) In the fifth phase, equipment will be received, certified, and assembled.

6) In the sixth phase, the apparatus will be tested to verify satisfactory operations condition and to generate dynamic nuclear orientation. Tests will probably include a repetition of some experiments with known results to verify that the same results are obtained.

7) In the seventh phase, tests on the samples to be used will be made to determine resonance conditions.

8) The apparatus will be modified to include a device for measuring the change in gravitational force; the magnitude of this force will be estimated.

9) A working model of a vehicle using the effect found above will be designed and built. It will be tested in a variety of environments.

10) A large-scale vehicle will be designed, built and tested.

11) Interplanetary exploration will begin.

SUMMARY

The research program proposed will proceed in stages, each of which will prepare the way for the following stage and will itself provide the maximum number of significant results. A structured program will be detailed in which every step will serve as a justification for the following steps; successful completion of each step will be required for the continuation of the following steps.

Accomplishment of the program is expected to require about four full-time personnel and two part-time consultants. The persons acting as consultants will vary with the needs of the program; they will be manned at the level described.

It is expected that the program envisioned *[Phase 1 – 8]* will require two years to accomplish and will cost approximately $300,000. *[According to the U.S. Department of Labor's CPI*

Inflation Calculator, this would be $876,142 in 2016 dollars. The figure might be considerably lower for an existing laboratory.]

Successful accomplishment of the program outlined will make possible the design of advanced spacecraft which can travel between planets in much less time and more cheaply than is now possible with rocket ships. These craft will be smaller and more navigable than rockets and can remain on trips through space for an indefinite period of time, since fuel can be collected during the trip.

The final report will detail technical accomplishments, describe costs, and will outline the expected uses of the research results.

It is expected that the probability of success of this program *[Ed note: all phases]* will be close to certainty since the theory deals only with known and accepted concepts of modern physics (although these are put together in a different way than usual). Moreover, only known and successfully used laboratory techniques are proposed to accomplish the goals outlined. Since these techniques will be investigated in areas where they have not been used before, it is inevitable that new scientific data will be generated in the program, even if not all of its stated goals are reached.

On the other hand, since the proposed and expected results are based on analogies which have been used successfully for many years, it is very likely that a large degree of success will be experienced. In such case, the way will be opened for large-scale and inexpensive exploration and colonization of the planets. Raw materials can be mined from outer space and brought back to Earth to replace dwindling resources. It is likely that materials in an already pure state for human use can be found and mined owing to the extreme conditions met in outer space. Manufacturing of products now requiring a vacuum can be inexpensively accomplished in outer space and new products manufactured in zero-gravity will be discovered. In addition, robotic manufacturing processes can be sped up by transferring the zero-gravity effect to robot armatures, since the inertia-free environment will allow running robotic armatures at extremely high speeds without overbanking.

BOOK II

Theoretical Foundation and Applied Technology

Dr. Frederick Alzofon

You never change things by fighting the existing reality. To change something, build a new model that makes the existing model obsolete.

— Buckminster Fuller

PART VI

Dialogs and Dialectics

I know all about *your theory. We studied it in high school, and there's nothing to it. We have much better theories now.*

— Project manager

at a well-known civilian space exploration company speaking to my dad on the phone in 2003. After hanging up, my father said he was gratified to know that his theory had finally been given a thorough review by experts, even if they were only high school students.

Chapter 26

INTRODUCTION

EVERY EFFORT HAS BEEN MADE to put the material of *Book II* in some kind of sensible order that builds from the simple to the complex. As an editor, the problem I faced as an editor was the great diversity of material to be organized, including, as it does, handwritten notes on telephone calls, transcripts of taped conversations, emails, briefing papers my father wrote for a lay audience, grant proposals that included cost breakdowns dating back to the 1980s, and one formal scientific paper from 2009, my father's last on the subject of the UFT.

Because the material was never intended for a book and was spoken or written over a thirty-year period, there is much repetition of certain key concepts. However, I felt it was worthwhile to allow the repetition because hearing the same concept described in different words often leads to insights that might not be possible by pinning one's hopes on a single document. In addition, almost all instances of repetition are accompanied by *unique* material which cannot be found anywhere else.

The reader is advised to simply plunge in and forge ahead, even when some questions are unanswered in the text. Chances are good that the answers will be found later in the book or in one of the related documents listed in *Appendix C*. It is likely that at some point in the scientific discussion, most readers will find themselves at sea. If you find the content sufficiently interesting, research the terminology on Google and then read it again. Many scientists without a formal background in physics will find it possible to navigate the deeper theoretical waters this way.

As stated in *Book I,*[47] *Book II* is not intended for all readers, but *every* reader can participate in launching the revolution by bringing this book to the attention of someone who *is* capable of understanding it, specifically physicists and electrical engineers, or entrepreneurs who might be interested in redoing the 1994 experiment for fun and profit—*enormous* profit (*if it works, see pp. 1 and 35)*.

Now that we've explained the diverse content ahead, it remains to provide some kind of brief, informal introduction to the physics. This task is best left to my father.

In the 1990s, I was in the habit of taking handwritten notes during our phone conversations. The following is a transcript of a conversation we had in 1993, a year before the experiment. Not being skilled in shorthand, I omitted words, articles and prepositions, possibly whole phrases, and I'm not sure I got the German right. However, it is a succinct statement of his point of view on the unified field, with something about the scientific method and the history of modern physics thrown in. All of these were constant themes in our conversations on physics, and while far from formal or complete, it does make a tantalizing introduction to the rest of the items on the theoretical menu.

My notes appear on the following page. We had been talking about how physicists look at particles and fields just before the transcript begins.

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[47] *See Chapter 5, p. 23*

ON THE UNIFIED FIELD

I am talking here about a field, not a point particle.

In the days of Newton, it was convenient to introduce a point mass—no extent, but mass. Now when elementary particles were discovered, it was natural to assign the properties of point mass to them. But as measurement got more refined, subatomic particles took that role.

But there's a difficulty: Quantum mechanics says you can't localize particles, but it refers to a field that is auxiliary, so they call this the diameter of the particle. They get around this by saying, "Sometimes it's a particle, sometimes it's radiation."

What I've done is to introduce a field that is a particle, or "Gespinstfeld" [*roving field*, Einstein].

He [Einstein] *considered quantum mechanics an incomplete theory, but didn't replace it.*

I have.

Simplicity is the essence of truth. If a physical model is close to the truth, and by truth I mean amenable to experimentation, then the description in terms of theory should be very simple.

It's hard to describe the feeling of the integrity of the theory, and you're able to manipulate the concepts in a simple way. It's like tapping fire-hardened ceramics—you get a "ting!" instead of a flat "clunk."

Elegant simplicity and directness, and it will lend itself to a tremendous gain in our understanding of the physical world and our mastery of it. I can see how the theory should be applied at the moment, but I'll never have a chance to communicate it unless I get a public forum.

Chapter 27

BUT FIRST, A WORD ABOUT EXPERTS

THE DISCLAIMER RECOMMENDS submitting the book to an expert for review before attempting to duplicate the 1994 experiment, or for that matter, embarking on a program to build a flying saucer.[48] If the reader heeds this advice, then the material in *Book II* will be the primary focus for expert review, though any comprehensive evaluation should include the 1981 Colorado Springs paper as well as the 2003 paper, *The Unity of Nature and the Search for a Unified Field (see Ref. 4, p. 348)*. The pitfall for readers genuinely in search of objectivity is that academic experts in gravitation are the *least* likely people in the world to render an objective opinion.

While a complete analysis of this peculiar state of affairs would require a book in itself, this chapter will explain it to some degree, without marshaling all the examples of less-than-objective treatment or conjecturing too deeply about the motives of the individuals involved. It will also go some distance toward answering a question that has no doubt occurred to many readers: "If this theory and the technology are so great, and they've been around for more than thirty years, how come somebody hasn't done something about it already?" *Part IV, Seven Milestones (p. 91), UFO Riddle #9 (p. 153)*, and *Chapter 27 (p. 199)*, and provide additional insights.

Let's begin with a direct answer to the question, "Who's an expert?" That is, who do *we* consider most likely to render an informed, unbiased opinion of the technology and its theoretical foundation?

The answer: PhDs in electrical engineering, particularly those who specialize in microwave technology or electron paramagnetic resonance (EPR), a technique used in electron *spin* resonance (ESR) spectroscopy. Particle physicists are another possibility. A stronger than usual background in mathematics will be required in either case. An understanding of special relativity is highly desirable.

And who is *unlikely* to render an unbiased opinion? Ironically, it is academic specialists in Einstein's general theory of relativity (GTR), which is the gold standard for gravitation theories, with every other scientific theory running a distant second or limping along in the crackpot leagues.

Before we begin, a word about "theory" itself. A scientific theory is not the same as, say, a "theory" that the Moon is made of green cheese or that "the universe is a living organism." A scientific theory has rigorous standards. Among other things, it must incorporate previously established facts and lead to predictions, *numerical* predictions. Predictions made by a scientific theory are not the same as predictions made by seat-of-the-pants guesswork, dreams, visions, or tea leaves. For more on what goes into a scientific theory, see page 250. The general theory of relativity meets all the criteria of a scientific theory. So does the UFT, although both theories deal with the same phenomena. They are therefore competing explanations of reality. Comparisons between them will emerge in the discussion below.

As the stature of the GTR has grown, so too has resistance to Alzofon's unified field theory (UFT). The UFT's point of departure is Einstein's *special theory of relativity* (STR). The STR preceded the GTR, and while the two *are* related, the STR is not regarded by GTR specialists as a gateway to understanding gravity, much less a unified field theory. While the issue could be settled—and *was* settled to my father's satisfaction in 1994—by *one simple experiment*, academics have never shown any interest in understanding the UFT, let alone putting it to the test.

Does this mean the UFT is fatally flawed or beneath consideration? The results of the 1994 experiment *alone* would argue otherwise, but let's examine academic response from 1960 to 2012: In all that time, no academic ever argued against the UFT on its own merits. *None*. Instead, they reacted one of three ways: they ignored it, they reacted emotionally and refused to talk about it, or they raised irrelevant and sometimes weird or idiotic objections *(e.g., pp. 18, 153)*. In short, they have done backflips in order to avoid studying it or confronting it. The very few who did debate my father learned that he understood the assumptions behind their position, i.e. the assumptions behind the GTR, better than they did, and they did not fare too well. My father used to say that academics preferred to ignore the UFT because they couldn't reject it without rejecting a body of facts at the core of modern physics.

What facts? Let's start with Einstein's special theory of relativity, which is the springboard for the UFT, as it was for the GTR. The STR is one of the most thoroughly validated scientific theories in history. The premise of the UFT—the substitution of a realistic, fluctuating light signal for the ideal light signal of the thought experiment—is based on experimentally verified fact, not idle conjecture.

The reasoning constructed on this slightly modified foundation is in the classical tradition that served physics so well for hundreds of years. My father argued that physics went astray when theoreticians chose faulty solutions to tricky problems that emerged in the late nineteenth and early twentieth century. This isn't a big revelation; the problems have been known for a long time and are readily acknowledged. It's just that the difficulties and their solution are now viewed as integral parts of nature itself. But the paradoxes and strangeness they produce have inaugurated a strain of mystical thinking in physics, which has been reinforced in popular literature. This provides more than ample justification for revisiting the STR. Quoting my father:

> *As a consequence of the natural outgrowth of the UFT from the STR, the UFT reduces to the special theory in the appropriate context, that is, it makes the same*

predictions as the special theory wherever the special theory is valid. However, the UFT extends the special theory to the region of high-energy processes where matter and radiation can be transformed into one another. Moreover, the UFT offers a means of removing troublesome and physically unrealistic infinities from the Coulomb-type laws that are valid for static fields (and low-energy processes), as well as those that occur in quantum electrodynamics. The latter features are not possible with the special theory in any direct manner. The UFT includes, as special cases, Newtonian mechanics, relativistic mechanics of a mass particle, Maxwell's equations of the propagation of the electromagnetic field, the gravitational field, and a continuous gradation of these into forces which may be identified with nuclear forces on a sufficiently small scale. It also makes predictions identical to general relativity. Consequently, it may be said that there is already a considerable body of experimental verification available for the UFT, even without the 1994 experiment.

Finally, the UFT provides a clear connection between the origin of inertial mass and the radiation field and a similar relation between inertial and gravitational masses. The special theory does not offer any such direct connections.

This is a rebuttal to a physics professor who, like so many others, didn't feel he needed to read "The Unity of Nature," because, as he put it (referring to the STR), "If it ain't broke don't fix it." That old time religion was good enough for him, in other words.

As noted by Dr. Hal Puthoff, a professional associate of my father's at SRI in the 1950s, and friend through the 1990s, the GTR explains gravitation via a geometric construct and does *not* provide any understanding of gravitation at a fundamental level.[49] Quoting from one of my father's emails:

The reasoning for Einstein's remark that the metric of space-time is a "real" entity is that the gravitational field is part of it and is observable, and therefore the metric is real. I don't believe in this approach, of course.

And, quoting from his final paper on the UFT *(p. 269)*:

The latter point of view has permeated theories subsequent to the GTR, especially as they relate to a model for the gravitational force field. That is, the field is assumed to be identified with the curvature of the space-time metric—a geometrical property, rather than one due to a physical dynamic process. In contrast, we propose an alternative model for the origin of the gravitational force field resting on properties of subatomic phenomena, rather than on an intrinsic property of the space-time metric.

In 1913, Max Planck said that gravitational theories were "falling thick as hail," making it hard for him to know where he might find a kernel of truth.[50] Planck might well have been interested in the UFT, however, because of its amenability to experimental verification, its ability to make many of the same predictions as the GTR, and its unique prediction that the gravitational force can be manipulated with present technology. There is *no* room for such a prediction in the GTR.

To summarize, the UFT is *not* radical in spirit, nor is it a departure from the historical evolution of physical theory. Rather, it is well-integrated into physical theory up until the time of the GTR. Like the GTR, it used the STR as a starting point, but it went another direction by adding a more realistic light signal to the STR. The UFT resulted from the inventor's deep study of particle physics and relativity in graduate school at UCLA and Cal Berkeley in the 1940s and 1950s. He was well aware of all the objections which could be raised against it, because he argued these with some of the best physics professors in the world, such as relativity expert Victor Lenzen and Richard Feynman, either of whom would have been delighted to punch a hole in the UFT. They failed.

At the very least, the UFT's respectable lineage and experimentally verifiable (we would say in all probability *already verified)* predictions make it worthy of discussion. In spite of that, academic response to the UFT has been oddly emotional and evasive, which suggests some underlying fear or prejudice. Examples are unfortunately abundant (a few have already been cited in the text), but one needn't look far for a motive, since the UFT completely *sidesteps* the GTR. If it is proven correct, it will, like Copernicus's heliocentric theory of the solar system, topple the edifice on which hang lifetimes of study, careers, grants, salaries, honors, publication contracts and royalties—not to mention the effect it would have on the self-image of many brilliant scientists. Everything considered "real" within this world would suddenly be up for grabs, a most uncomfortable proposition.

As Professor Thomas Kuhn has shown,[51] social factors in science are never mentioned overtly, but to pretend that they don't exist would be the height of absurdity. Experience has shown that they cast a rather long shadow over academic thinking, wherein the power to control high-level discussion on gravitation is vested, and of course, the ability to control funding for gravitation research.

This book is not intended as a critique of general relativity. Nor is it intended to be an attack on a certain segment of academia or a defense against criticism from that quarter—especially since there *isn't* any criticism to defend against. Indeed, the thundering silence of academia is one of the stranger aspects of this narrative, since the inventor published many peer-reviewed papers and books in his lifetime, including a paper on "Relativistic Neutron-Proton Scattering in the Born Approximation," in *Physical Review*, and was an acknowledged world-class expert in two areas where relativity plays a role: optics and radiation scattering from objects of arbitrary shape. In short, he knew whereof he spoke. Only in the area of gravitation and unified field theory did the "reality distortion field" take hold.[52] The purpose of this chapter is to answer the question "Who's an expert?" and justify our answer by establishing the integrity of the UFT and explaining how it is perceived by experts in the GTR, the only theory of gravitation with any currency these days.

Whenever my father submitted a paper on the UFT to the major journals, he used to brace himself for the peer reviewers to discover the fatal flaw he had overlooked. What he got—when he got anything at all—was irrelevant nonsense, if not hysterical ranting. I read some of the comments myself, and even though I am not a physicist, it was easy to see that not one reviewer *ever* addressed the central points of his thesis. Indeed, it seemed as if they were purposely avoiding confronting it head-on, or worse, they had never even read the paper at all. Since the major journals have no "court of appeal," no way to respond to peer-review criticism, he was forced to turn to a second-tier journal that did allow it. The peer review criticism there exhibited the *same* characteristics it had in the major journals. His rebuttals to the reviewers were rather devastating, which is why the editor saw fit to publish.

Academics who were accustomed to thinking of themselves as the smartest guys in the room all their lives had a tendency to underestimate my father for a couple of reasons:

First, he left academia for aerospace in the mid-1950s. To them, this seemed to mean that he had no authority to speak (or publish) on matters relating to theoretical physics, that is, no standing to speak about the GTR, where all questions about gravitation are referred first.

Second, they underestimated the depth of his study of relativity or his knowledge and experience in experimental science. They did not know of his habit of questioning every assumption that his professors (and theirs) glossed over on the path to the GTR. One of the recipients of his relentless questioning was Professor Victor Lenzen, a leading authority on relativity and a student of logical positivism under Bertrand Russell. Lenzen was quite happy to debate the fundamental assumptions of the STR and the GTR, or any aspect of modern physics, with my father. It was a good training ground.

When professors began to throw mathematics at my dad, they came up against more unexpected depth. The source was his mentor and PhD advisor, Professor Griffith C. Evans, namesake of Evans Hall of Mathematics at UC Berkeley. (My father revered Evans more than any professor he had at Cal.) The professors who debated the UFT with him found the experience disconcerting. The nobody with the eccentric notions about relativity became a threat in short order, as he made them look like they didn't know what they were talking about. Most of his opponents would assert their rank, usually with an outburst of righteous indignation, and then run away as fast as possible (*see pp. 18, 153)*.

While my father was an expert in relativity, particle physics, applied mathematics, and the scientific method by the time he left graduate school, he continued to supplement his knowledge by reading current and past publications, especially on relativity—many in the original German or translated from Russian—all the way through his 93rd year. I never saw him spend fewer than six hours a day reading and writing about physics. He always knew that there was a gulf between his thinking and that of experts in general relativity, and he wanted to find better ways to communicate with them, so he read all the latest material on general relativity at the OSU library. He found nothing there to persuade him that he was on the wrong track. On the contrary, the more he read, the more convinced he became that he was right. He also became more pessimistic about persuading anyone who was committed to general relativity that another way was possible.

Unlike Nikola Tesla, however, he had no ax to grind with Albert Einstein. Indeed, he revered Einstein more than any other physicist and would have been the first to acknowledge that the UFT was merely a modest extension of the STR. The proof can be found in a 1955 letter he wrote to Einstein expressing his admiration for the latter's work and describing an early form of the UFT *(see p. 97)*. Unfortunately, Einstein died April 18th, 1955, before any dialog was initiated. The letter to Einstein had been prompted by his 1954 meeting with Richard Feynman, who told him he was "on to something" and encouraged him to publish *(see p. 93)*. The meeting with Feynman, more than anything, set in motion the events described in this book. Feynman was the dedicatee of my father's final paper on the UFT in 2009 *(see p. 269)*.

In short, the UFT is not an amateurish construct. Rather, it is soundly and thoroughly based on a slight, well-justified modification to Einstein's special theory of relativity. From this modest "correction," he derived an operational definition of gravitation and many other significant results:

The success of the special theory of relativity in predicting the results of three crucial observations establishing the validity of the general theory of relativity and the elimination of the infinite vacuum energy suggest that the unified field theory [UFT] *can lead to a solution of the cosmological constant problem.* (See p. 269).

We have stated that this book is not an attack on the GTR. Nor are we here to defend the UFT. It is enough to establish the intellectual pedigree of the UFT and use it to posit an experimentally verifiable explanation of the origin of the gravitational force, one that has been formulated according to the rules of the scientific method, and that—unlike the GTR—can readily be harnessed to applied technology, such as the revolutionary propulsion system described in this book. That is all we intend to do, and if organized science were as true to its ideals as it advertises to the world, the theory would have been tested long, long ago. Instead, it has been ignored, with potentially devastating consequences.

If the reader agrees that the UFT is worthy of investigation, and contrary to our advice submits this book to an "expert in gravitation," the reaction will be fairly predictable: They will not be intrigued by the theory nor interested in its predictions. Rather, they will first glance at where the UFT was published, and then dismiss it immediately when they find out it was not published in a top-tier journal. If they read further at all, they will view it as an assault on all they hold sacred, even though it scarcely mentions general relativity at all. You may expect the criticism to begin early, and to become quite heated. Rejection, if not ridicule and contempt, is a certainty. If on the other hand, you give this book to a PhD in electrical engineering, they will grasp its points immediately and they will see that it refers to established knowledge and known techniques, not guesswork and humbug.

If you seek the opinion of an expert in the GTR, bear in mind that academia has long acknowledged that there are difficulties with general relativity. At the same time, they have consistently sought to fix these difficulties by tweaking the GTR, *never* by reconsidering its basic assumptions. This is even less likely now than in 1960, when Dr. Maurice Garbell, author of an Air Force-commissioned worldwide survey of gravitation research (*see Appendix C, p. 347, Ref. 1a)*, told my father that the UFT would never be investigated at *any* academic institution, even though it was the only theory on gravitation that Garbell had seen that "had a prayer of an engineering application."

The possibility of settling longstanding issues in the GTR, the allure of an easy Nobel Prize, and the exciting prospect of opening a new frontier in technology and space travel—all of this has held little romance for academia, which has steadfastly resisted even *looking* at the UFT. Meanwhile, they have launched big-budget, empire-building projects to explore general relativity and particle collisions. The effort to detect gravity waves is a case in point (more below).

While the GTR has made many good predictions, the simple fact that unlike, say, Maxwell's equations, it has not resulted in a *single instance* of applied technology somehow gets lost. This departure from classical physics, which has always resulted in an abundance of applied technology, does not strike its partisans as the least bit symptomatic of a fundamental conceptual flaw. Rather, the absence of progress in applied technology seems to them to represent an insurmountable wall built into the fabric of nature, rather than an illusory barrier built into the assumptions of the GTR. To suggest breaching that wall, or even to suggest that such a thing is possible, provokes patronizing smirks, indignation, and in some cases, wrathful condemnation, and *always* an abrupt end to the conversation.

This brings up the topic of gravity waves, which were predicted by the GTR at the beginning of the twentieth century and confirmed in 2016. My father and I discussed this subject a few times over the years, and he said that whether or not gravity waves were detected, it would have no impact on his theory of the origin of gravitation. The *converse*, however, may *not* be true. It is my guess (not his) that if the 1994 experiment is repeated successfully, it will force a reinterpretation of the results of 2016.

It is regrettable that this subject needs to be brought up at all, but the academic blockade of my father's gravitation theory has been an ongoing and at times weirdly comical sideshow in this saga for more than fifty years. If it were *not* mentioned, it would tend to have a corrosive effect on the rest of the narrative. In spite of the extended airplay I've given it here, it really does not deserve the spotlight. If my father is *correct*, the resistance of academia is something for a scientific historian such as Thomas Kuhn to sort out, and if the UFT is *not correct*, any brouhaha would be moot.

Make no mistake: this book is *not* a plea for vindication of the UFT. Professors can hurl stones at the points raised here, but their judgment is completely *irrelevant*, since we are not taking our plea before a court of academics. We are taking it to the ultimate court of appeal, the court of Nature. Fifty years ago, the verdict might have been a matter of academic interest only. Today, it might well determine the future of humanity. If there's anything to it, that is. We won't know that until someone redoes the experiment.

Since academics are likely to take umbrage at the foregoing characterization, let me say that this is merely the account of an eyewitness to fifty years or so of history. I am not qualified to argue the virtues or faults of the GTR vs. the UFT, and the time when physicists could have debated the question with my father has come and gone. Let me reassure any insulted parties that his criticisms of the ivory tower were *extremely* mild compared to what they might have been. I would describe him as saddened, rather than angered, by the reception given the UFT, and the thing that saddened him most was not the lack of recognition—it was the catastrophic loss of time.

In 1981, his invention might have averted climate change entirely while opening the space frontier and stimulating the global economy to an extent not seen since the Industrial Revolution. By 2012, he thought that its only use might be as a lifeboat for a few survivors of the coming catastrophe, and that this group would most likely be self-selected from among the upper one-tenth of one percent of the economic strata. I don't know whether I agree with this Morlocks-and-Eloi vision of the future, but I do know that he never wanted gravity control to belong to the military and the wealthy elite alone. This is one of the reasons I have emphasized historical parallels to the beginning of the first Industrial Revolution. This isn't science fiction and there are no secrets about it. It is simply another step in the evolution of technology, and like almost all the others, it is merely the application of two old, well-understood technologies in a new way.[53]

In my view, trusted institutions have failed their mission, which is, nominally at least, to further the cause of science and humanity. Occurrences like this are rare, but not without precedent. On those occasions when they do occur, it becomes necessary to seek alternate routes to advance a legitimate cause, even routes that are unconventional, such as the present volume. As an institution of one, I don't relish the idea of riding into the public arena on a lone horse, waving a tattered rebel flag under the noses of powerful interests, but given the stakes, it is a dire necessity—for *everyone*, including powerful interests. "Corporations are people, my friend," as one presidential candidate was kind enough to remind us. But not a single corporations will choke to death when the atmosphere becomes unbreathable. As for we the people—the real people—that's another story.

So let me sound the theme once again:

Not all experts are created equal. The experts most likely to read the book with an open mind are PhDs in electrical engineering. The least likely to render an objective verdict are experts in gravitation who have made a lifetime study of the GTR.

Who is right and who is wrong cannot be settled by scrutinizing the pedigree of the UFT or by dueling with chalk sticks in front of a blackboard. No criticism from *any* quarter can be taken seriously as long as the critics are unwilling to rerun the 1994 experiment. If and when anyone decides to take up the challenge, we are confident that they will act honestly and honorably and

- Follow instructions carefully; making modifications *only* when absolutely justified
- Give a fair and accurate accounting of the results
- Duly credit the proper source

- Consult *Appendix F (p. 363)* before filing patents

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[48] *See p. 1*

[49] *See H. E. Puthoff, "Gravity as a Zero-Point Fluctuation Force*, "Phys. Rev. A 39 (1989) 2333.

[50] Intellectual Mastery of Nature, Theoretical Physics from Ohm to Einstein, *Vol. 2, by Christa Jungnickel, Russell McCormmach, University of Chicago Press, 1990, p. 329.*

[51] *Kuhn, Thomas,* The Structure of Scientific Revolutions, *University of Chicago Press, 1962 (50th Anniversary Edition, 2012), ISBN: 9780226458113*

[52] *Bud Tribble coined this useful term to describe the effect of Steve Jobs' charisma on his surroundings. I heard it for the first time while working at Information Appliance in the 1980s, but not from Jef Raskin or Bud Tribble (who worked there briefly). Rather, it was one of the IAI engineers who had worked at Apple around the same time as Jef.*

[53] *Referring of course to adiabatic demagnetization of paramagnetic salts in cryogenics, which dates from 1926, and dynamic nuclear orientation, which dates from the 1960s, to achieve, in effect, a "cryogenic cooling" of gravitation.*

Chapter 28

GRAVITY AND ANTIGRAVITY

ON THE EVENING OF Thursday, January 28th, 1993, my father and I returned from dinner at a French restaurant in Corvallis, where a couple of glasses of wine had undoubtedly been consumed. He was in a generous and expansive mood, so I took advantage of the occasion to remind him that he had promised to record a lecture that I could play for potential investors in gravity control. The result has been transcribed below.

By the time of this talk, my father had already given me hundreds, if not thousands of physics lectures throughout my life. He had also taught courses in relativity, advanced physics, and mathematics at the university level, so he was no stranger to public speaking. However, it was *extremely* rare that he ever consented to being recorded. For this reason, some of his greatest physics and mathematics lectures have been lost. Among these was one that he launched into spontaneously on a road trip from Corvallis to Newport that covered the entire history of physics with a clarity I can scarcely describe.

The loss of that unique and brilliant lecture had been weighing heavily on my mind ever since, and in view of how difficult it was to get him to record anything, I was hoping to capture something similar. His responses were well-crafted, but it wasn't everything I had hoped, probably because he was tired. But as I listen, I'm grateful to have any record at all of his exceptional speaking ability.

The following transcript represents roughly ninety minutes of conversation, and though it may sound as if he was reading from a book, there is virtually no editing: the entirety of his remarks were off the cuff. He was also careful to tailor his language to an audience of intelligent laypersons, which is why this talk makes an ideal departure point for the rest of the material in *Book II*, which pursues the same subject matter at increasingly higher levels of sophistication. The 1981 paper, which is not included here, is too advanced for this book, so I made no effort to include it, but it is available online. All publications on gravitation are listed on page 347.

Bear in mind that this talk came roughly twelve years after the 1981 Joint Propulsion Conference paper and a year and a half before the 1994 experiment.

THE DIALOG, JANUARY 28, 1993

DA: How do you explain this mysterious force, gravity? Why has it been such a mystery?

FA: Well, first of all, the nature of gravitation ever since the time of Newton has been known to be pretty clear cut. Gravitational force exists wherever you have masses, and this is speaking on a macroscopic scale, that is, greater than atomic scale. And this is a force that is always attractive and it exists between any two masses. The masses are usually imagined to be electrically neutral, and the force, of course, is always an attractive one.

But in modern times, we have come to the realization that matter is made up mostly of empty space, and that the matter—what we call matter—is limited exclusively to elementary particles. These are particles that are roughly of a diameter of 10^{-13} centimeters. This is about the same size as an atomic nucleus, and of course nuclei are made up of an assemblage of elementary particles, so that you might say now that gravitation, while we do observe it on a macroscopic scale, is characteristic of some property of elementary particles, because mass is limited in its existence only to elementary particles.

So the question, of course, is what property do elementary particles have in common that will give rise to the gravitational force for all of them? Because the thing is, that the gravitational force appears to be the same for any type of mass—for stars interacting with the Earth, or with each other, or cold dust in space, over a wide range of temperatures and types of matter: You have the same force acting, and the same force law. With respect to our modern knowledge, we know there are many kinds of elementary particles and yet there again, there seems to be the same force acting, the gravitational force, no matter what kind of elementary particle there is.

So, my point of view is that the thing that elementary particles have in common, you might say in a way, is simply that they exist. That is to say, that they are stable. And this stability in my theory is associated with the internal structure of these particles, which I imagine to be made up of electromagnetic energy, or *field*, that has somehow become twisted in on itself on this very small scale until a hard knot forms. Another way of saying it is that matter is condensed electromagnetic energy and that electromagnetic energy is dispersed matter.

So this argues a kind of universality of the property of being matter: It's all made out of electromagnetic energy or something similar to it. And if that is so, then there is some reason that the particles which are made up of a random motion of the field that forms them—there's some reason that it holds together and is stable. Now whatever it is, it is unnecessary to know in terms of my theory—simply that it does exist and it is characterized by a diameter which is equal to Planck's constant divided by the mass of the particle times the speed of light: the Compton wavelength. That is a single parameter in my theory which is descriptive of the stability of the particle.

h/mc = Compton wavelength

We imagine the particle to be made of a dense accumulation of energy which is increasingly dense toward the center, less so as you go out toward the outside, until the matter shades off into a field

—the gravitational field. I view the field, the gravitational field, and the matter composing the particle as a single entity. There is a unity of matter and radiation in my theory which is very important for the understanding of the gravitational field, where you imagine that the variation of the energy density is something like a Gaussian distribution, kind of a bell-shaped curve.

Now if you imagine this distribution of energy characterized by that single parameter in the presence of another particle, then these distributions of energy overlap. Now in terms of a single particle's view of its environment, what it sees is that it has gained some mass, and now the condition for stability—which is, as I said, a single parameter, *h/mc*—that parameter has changed, because the mass is different now: there's more mass-energy, more rest mass-energy, *mc*-squared [mc^2]. And for that reason the equilibrium condition itself has changed: It's *h* divided by a different mass now, times the speed of light. And in general, the original mass has now been increased, so that the parameter is decreased.

Of course, the distribution of energy now has to have a smaller diameter, and in order to do that, for equilibrium to take place, the energy has to stream toward the center of the single particle I'm speaking of, or at least there's a tendency for it to do that, and this results in an attractive force on the second particle. The way of codifying and formalizing this tendency is in terms of what is called Le Châtelier's Principle, which is a very general and well-accepted principle, and it says that if there is any physical system in equilibrium and its condition is slightly perturbed, then all the parameters of the system will change in such a way as to restore an equilibrium condition. It may not be the *same* equilibrium as before, but it *will be* equilibrium. In the case we're considering there's only one parameter describing equilibrium, and that is *h* over *mc*—and that must change, according to Le Châtelier's Principle, to preserve equilibrium and stability.

This is the origin of the gravitational force.

DA: So now, since we have a foundation for understanding gravity, we're now going to talk about a means of altering the gravitational field.

FA: The alteration of the gravitational field falls directly from the model that I spoke of before. We imagine every particle as being made up of a random variation of energy in its interior. This situation is quite similar to the one in molecular physics, where you can imagine, for example, a container full of a gas. The molecules in the gas are moving randomly and as a consequence they're carrying energy in a random manner from one part of the container to another.

Now if we want to alter the mean energy of this gas, there is a well-known method of doing this. Let's consider a paramagnetic salt, for example. There is a process called *adiabatic demagnetization*, which is used to cool the surroundings of a paramagnetic salt. The process, which is similar to the one that we suggest for altering gravitation, is that a constant magnetic field is applied to the salt. This orients the molecules in the salt in a single direction.

Now after the slight heating that might be generated by applying the magnetic field to these molecules has died away—that is, the heat generated has been transmitted to its surroundings, and all the molecules have come to a common temperature, the magnetic field is taken away very suddenly. That's the origin of the word "adiabatic." These molecules are left standing all oriented in the same direction. However, the surroundings are made up of molecules that have *not* been oriented, and they bombard the *oriented* molecules and disrupt their orientation. In the process of doing that, they do *work* on those molecules, and they lose some energy themselves, and on a macroscopic scale that is observed as a reduction in temperature. This method of cooling is used to arrive at very, very low temperatures.

In the case of the gravitational field, I'm suggesting doing something very similar. What we do is to get a suitable material and orient the nuclei of that material by means of a process called dynamic nuclear orientation. Most of the mass, most of the weight in the object comes from the nuclei, because the nuclei are made up of particles, each of which are about 2,000 times heavier than the electrons surrounding them, so that we expect to get most of the effect by orienting nuclei. The effect I'm speaking of is reduction of the gravitational force acting on the matter that you're using as a specimen.

DA: It seems we've changed from talking about using an electromagnetic field to orient nuclei to talking about *dynamic* nuclear orientation. Can you explain the difference? *[In spite of having read the 1981 paper, I didn't grasp the similarities and differences between adiabatic demagnetization of paramagnetic salts and dynamic nuclear orientation. He is about to clarify that.*]

FA: No, I have *not* changed from talking about an electromagnetic field. The field applied to the molecules is a constant magnetic field.

DA: And that's all that's meant by dynamic nuclear orientation?

FA: That's all that's meant by adiabatic demagnetization as a method of reducing the temperature. Now in dynamic nuclear orientation, what you do is to apply a constant magnetic field to the specimen, and it *[the specimen]* has to be properly chosen of course, and this causes the electrons around the nuclei to precess around the direction of the magnetic field. The frequency of precession is called the *Larmor frequency*.

DA: Can you explain what "precession" means, please?

FA: It's very much like the motion of a top that is spinning on the floor and begins to wobble around a vertical axis. That's called "precession." Its axis of spin rotates around the point of contact of the top with the floor, around a vertical axis.

[Now he continues the description of dynamic nuclear orientation] We then apply a microwave field of the same frequency as the Larmor frequency to the electrons and this causes them to precess so violently that they turn over and they become oriented relative to the direction of the constant magnetic field.

DA: “They become oriented relative to the direction of the constant magnetic field.” Are they oriented *in line* with it, then?

FA: It’s never quite that simple. Actually it’s a distribution of orientations according to the principles of the quantum mechanics. They’re oriented in such a way that the projection of the magnetic moment of each electron on the direction of the constant magnetic field varies in half-integer multiples of Planck’s constant. However, the distribution of orientations has been shifted in the direction of an orientation—there’s more orientation around that direction. As you can imagine, the situation that I’m speaking of is not quite as simple as I’ve described it. But that’s more or less the idea.

The angular momentum change in the specimen due to the flip-over of the electrons has caused the conservation of angular momentum to be violated. To restore it, the nuclei also flip over. Another way of saying it is that the electrons are very close to the nuclei and can interact with them very strongly. Even though the magnetic fields originally applied are not enough to turn the nuclei over, the fact that the electrons have turned over causes the nuclei to turn over. Now the nuclei are also oriented relative to the direction of the constant magnetic field.

Now, in analogy to adiabatic demagnetization of paramagnetic salts, we shut off the microwave field very suddenly. That leaves the nuclei oriented. Their surroundings, however, which are composed of—in the case we imagine, at least—to be the gravitational field, which is due to randomly varying energy, interacts with the nuclei.

The manner of the interaction is not being specified here. I have done a considerable amount of research on it, and the conclusion I’ve come to is that the gravitational field interacts mostly with the outer fringes of the electrical charge around the nuclei. But it doesn’t really matter. If there’s any interaction at all, the gravitational field will tend to disorient some of the orientation of the nuclei, and do it probably very quickly. In that case you would expect the gravitational field to be weakened—in effect, you might say its temperature is reduced—and the strength of the magnetic field will also be reduced. So that what we have generated is not antigravity so much as reduction in the gravitational field.

[Part of the discussion is missing from the recording here. The missing portion must have concerned the slight increase in the gravitational force which is anticipated when the microwave field comes on and drives the electrons into flipping over. The predicted weight increase was observed during the experiment, which constituted a significant corroboration of the theory. The momentary spike in weight is analogous to the momentary heating observed in adiabatic demagnetization discussed above. The transcript resumes in midsentence, with FA discussing what occurs when the field is shut off]

...microwave field is shut off. Then is when you expect the gravitational field to be reduced. Any vehicle that depends on a process like that will exhibit a kind of bobbing motion, like a saucer being flipped over the surface of water.

DA: Well, as long as we've shifted to the topic of alien technology and how it relates to your theory—without revealing anything, of course, that is proprietary—why don't you talk about some of the features of UFO flight which your theory explains.

FA: The theory that I have described is semi-quantitative and not very detailed, and yet the great value of the theory is that even without that it is possible to predict effects that can be tested by experiment, and it also can be used to explain a great deal that seems to be known about the alien craft—the UFOs.

In the first place the most promising material to get a nuclei oriented is aluminum, because the aluminum nucleus has a very large magnetic moment. Unfortunately the electrons around the nucleus of the aluminum element shield it from a magnetic field and it's very difficult to use a magnetic field on the exterior to orient the aluminum nuclei.

However, you can orient, for example, the ferromagnetic elements' nuclei very readily. However once you've taken the orienting field away, the orientation of the ferromagnetic material—nuclei—decays very rapidly in something like 10^{-7} to 10^{-9} seconds at room temperature. Now what you can do though, is to put very small particles of iron, or else cobalt perhaps—any element that is ferromagnetic—embed it in the matrix of the aluminum material, and because these nuclei are very close to the electrons of the aluminum nuclei, they can act upon it. You can then orient iron nuclei, those in turn will orient aluminum nuclei through the intermediary of the electron cloud around both of them, and the aluminum nuclei have a very long orientation lifetime. At room temperature about 20 degrees centigrade, the lifetime of orientation of aluminum is about six milliseconds, which is very long. As the temperature of the material decreases, the lifetime of orientation becomes very, very long.

Material from UFOs has been collected—some pieces have been shot away from UFOs, and one UFO exploded and pieces were picked up from that *[the crash occurred in Brazil, in the southeastern coastal city of Ubatuba, in the state of Sao Paulo, September 14th, 1957]*—and they do indeed seem to have very small iron particles in the presence of aluminum or magnesium. Both aluminum and magnesium have similar properties about long-term orientation lifetimes for their nuclei and high nuclear magnetic moments. However, magnesium has a tendency to explode, to catch fire in the atmosphere—presence of oxygen—and aluminum does not *[debris at Ubatuba was found to consist of 99.99% pure magnesium*].

Aluminum, besides, is a very good structural material and certainly on the Earth, aluminum exists overwhelmingly in the form of a single isotope and is very common throughout the Earth's crust, so it makes a very good structural material in availability and strength and so forth, lightness.

The characteristics of motion of a vehicle due to the pulsing of the microwave field have been mentioned, and there are photographs showing that this does exist. The length of the wavelike motion of the vehicle corresponds to a—roughly that is, roughly—to a time of about six milliseconds, which again is predicted by the theory. In addition to that the nature of the reduction of the gravitational field requires that some other method of propulsion within the atmosphere is needed. That has presumably been seen. Sometimes rocket jets are observed. Sometimes there are rotating discs which appear to have slots in them that can thrust against the atmosphere. These are also observed.

The question of very high speeds has come up, and the very high accelerations, which presumably would crush any inhabitants in the vehicle. But inasmuch as the field that reduces the gravitational force would also affect inhabitants within the structure is concerned, the destructive forces on the inhabitants would not seem to be a problem.

DA: Inertia would be altered along with the gravitational field?

FA: For a long time it has been felt that the gravitational mass and inertial mass must be due to the same mechanism because they are equal. In terms of my theory, inertial mass occurs because there is an internal motion to matter of the sort that I have been postulating. This internal motion results in a rest energy of mc^2, and the internal random motion is however *reduced* in my suggested model for gravitation—that is, gravitational reduction—and if that internal random motion is reduced, necessarily the inertia of matter is also reduced in exactly the same proportion—I *think* in exactly the same proportion. And the origin of inertia due to internal energy is very, very similar to the origin of a kind of inertia in an electric circuit—especially one with an inductive impedance, because this is an analogy to what I'm talking about in terms of rest energy in a particle. In a coil, for example, if a current is flowing through it, a magnetic field is generated surrounding the coil.

Now if the voltage pushing the current through the wire—coil—is shut off suddenly, the magnetic field will collapse inward toward the wire coil and the effect of its cutting the—the lines, magnetic lines of force cutting the coil—will generate an electric current which tends to flow in the opposite direction to the tendency of the original electric current from stopping. It will tend to oppose the electric current stopping. Similarly if you begin to generate an electric current in a coil, the magnetic field will expand outward and a counter-voltage will be created which causes a current to oppose the original impressed current. So that no matter which way the current tries to go, there is an opposing inertia—a sort of inertia—that prevents it from flowing in the direction it wants to go, and this is an internal motion which acts just like an inertia.

More to the point, perhaps, is another model in which you have molecules placed in a container, and the molecules have an internal motion and they bounce off of the walls of the container. Now if you try to move the container rather rapidly in one direction or another, the molecules will strike harder on the surface moving toward them and less hard on the surface moving away from them, of this container, so that they will tend to hinder the motion of the container.

Again, that is due to the internal motion of some object within the container, or within the system, and this creates a kind of inertia. Similarly the random motion within elementary particles is considered to resist acceleration imposed upon them in the same way. But this, as the model of the gravitational force has illustrated, this is the *same* process as causes the gravitational force. That is to say, the random motion within the physical system is responsible for the gravitational force and for inertia, and in both cases the effect is proportional to what we call the mass or the rest energy.

DA: So this concludes our question and answer session for today, Thursday, January 28th, 1993.

I could see that my dad was getting tired, and not wishing to put him under any pressure, I drew the conversation to a close.

Chapter 29

RANDOM THOUGHTS ABOUT ENGINEERING

THE SECOND question-and-answer session transpired on the following day. My dad's enthusiasm for talking had considerably lessened, as can be seen by the brevity of his responses and the duration of the conversation itself. Nevertheless, it produced some answers that won't be found anywhere else.

RECORDED JANUARY 29th, 1993

DA: The question for today is to envision a program to build a spaceship and imagine some of the project goals and pitfalls that would inevitably occur. Oh—*money is no object*.

FA: You'll have to ask some specific question.

DA: Okay, what would step one be? Design the hull?

FA: Oh, we'd have to enlarge the scale of the model we built. Presumably we've built a model that works, but now we have to increase the size of the ship. And the phenomena that we rely on may not be increased in the same proportion as the size of the ship, so I guess we have to start the design and do some theoretical work to see what magnitudes we can expect for it. What the power has to be and how much of an effect we can expect. Is that what you wanted to know?

DA: Sort of. What are the main components of the ship? At least give me that.

FA: I can't tell you that, David.

DA: You've already put it into print in a paper.

FA: Well, let's say antigravity screens, how's that?

DA: What are those?

FA: Aluminum screens that you bolt into place on the surface of the vehicle, and the power plant ... *[inaudible]* successively orient the nuclei and then orient them again.

DA: Is there a way of testing the orientation in real time?

FA: I don't know.

DA: Okay, so we need a power plant.

FA: Uh-huh.

DA: We need shields...

FA: Screens.

DA: Screens, thank you. Why do you call them "screens"?

FA: Because they're sheets of metal, and screens look like that.

DA: And you talked about generating the effect in a central core and running it out on wires to the screens?

FA: That was one possibility I considered, yes.

DA: It's as good as any. We need a cabin.... How much protection do the occupants need from the microwaves?

FA: Well, we'll include shielding from the microwave field.

DA: Is that a shell that surrounds the cabin?

FA: Yeah, mm-hm.

DA: Okay. Now how come that part of the ship gets involved in the effect, and it's not *isolated* from the effect *[by the shielding*]?

FA: Oh, it *is* isolated from the effect.

DA: Doesn't that mean then that the accelerations will toss the occupants around?

FA: Oh, I see what you mean. I thought you meant isolated from the microwaves. No, it's *not* isolated from the effect *[gravity/inertia reduction]*. The field generated will tend to cancel out, reduce the mass of the occupants. That's true. Uh-huh.

DA: Okay. Do we need special uniforms or suits for the occupants?

FA: It'll help if they *[the flight suits]* have a fabric with aluminum threads woven into them, I think.

DA: Would that conduct the effect to the molecules of their body, or would that simply help shield them from microwave radiation?

FA: I think it'll just shield them from microwave radiation.

DA: Okay. Do you think that designing the hull will be a difficult problem—I mean from the standpoint of strength, temperature resistance, uh...?

FA: Well, we'll build it like a submarine hull is built. How would that be?

DA: The submarine hull withstands pressure, but it doesn't have temperature problems?

FA: Well, a submarine hull is built for strength—structural strength. That's about all I know at the moment. I can't predict what kind of stresses it'll be subject to.

DA: You said something about thermal activity lessening the antigravity effect.

FA: Hm, yeah. The constant switching back and forth of orientation and disorientation probably will generate heat—how much, at the moment I don't know, and how much dissipation of heat will be necessary, I don't know either.

DA: Passing through the atmosphere would also generate heat.

FA: The indication—and it's not very clear—the indication is that the ionized layer of gas surrounding the vehicle will minimize the friction due to the atmosphere on the metal hull. I can't say very much about that, either.

DA: Okay.

FA: The other thing you can do is just go up out of the atmosphere before you turn on the high velocity.

DA: Go slow?

FA: "Go slow?"

DA: Up out of the atmosphere slow?

FA: Yeah.

DA: Okay. Um, now you need some kind of propulsion.

FA: Well, rocket jets would do very well. You can also install a rotating rim that has slots in it, and the slots have angled edges so that you can push against the atmosphere.

DA: What, kind of like a *windmill* effect, or...?

FA: Something like that, yes.

DA: How does that steer you, though? I can see rockets steering the ship, but I can't see the...

FA: You tilt the vehicle in the direction you want to go, and that would steer you. Uh, how do you tilt the vehicle? You perhaps increase the weight on one side over the weight on the other side.

DA: Okay. How long do you think it would take, with an unlimited budget, to build this thing?

FA: Well, the problem would be to get skilled workers. I'd say maybe five years.

DA: Well, that won't do for a novel. Have to do it in one year.

FA: That is not very practical.

DA: I realize that—we're going to *lie!*

FEA [*unamused*]: Okay. You can perhaps get a water tank and install the equipment in that—or a gas tank.

DA: What kind of a.... Well, that's not what I'm thinking of. What kind of a steering mechanism do you think would be optimal, for the pilot? A joystick? A...

FA: Oh, you mean what it would look like in his hands?

DA: Yeah, in his hands—the control mechanism?

FA: I guess a joystick would be a good idea, yeah.

DA: What about up and down motion? A joystick is four-directional.

FA: Mm-hm.

DA: What about movement up.... Maybe you could lift it and pull. Maybe it could be lifted and pushed, and, well, anyway....

FA: I can't think of anything.

The tape runs out here, with many questions left unasked and still more unanswered.

Chapter 30

TECH TALK WITH JIM McCAMPBELL

INTRODUCTION

The following is a transcript from the tape of a rare meeting between my father and Jim McCampbell at McCampbell's home in the Belmont Hills, near Crystal Springs Reservoir. I wasn't present at the meeting, but my dad made the tape at my request because I believed that with McCampbell's pull at the Department of Energy and other organizations, an experiment was bound to be in the offing, and I wanted to document the events that led up to it for history if it was successful. As it happened, none of McCampbell's efforts bore any fruit and the experiment came about through entirely unexpected channels six years later.

THE DIALOG, MAY 19th 1988

FA: We're at the home of Jim McCampbell. We're discussing the theory of gravitation and how it might apply to observations, explanation of UFO behavior. We have already been talking about the theoretical foundation of the gravitation theory, and I'll have to supply that later. That is the part that will be missing from this tape.

JM: And what we want to do first is to work through an agenda, and I'll mention the items I have noted.

FA: Okay, these are JM's items.

JM: Right. I want to call your attention to the British position in all of the questions afoot—which I'm sure you've had no chance to, you know...

FA: No, I don't know anything about it.

JM: Okay. Well, I can hit that easily and quickly. Then, by the reduction of mass of the machine, based upon your theory...

FA: Mm-hm.

JM: ...then it's quite easy to cause it to move the way you want to. In other words, the forces requirement is surprisingly small. And I've made some calculations along that line.

FA: Mm-hm.

JM: And they're revealing, and in that context there is a tremendously important paper called "Electromagnetic Propulsion without Ionization." It came out of the *Journal of Spacecraft and Rockets* in 1981, and I noted it at that time. I threw it in here for—couldn't do anything with it, but now it makes every bit, all the sense you can imagine.

FA: Hm, interesting.

JM: And then.... Okay, then I want to review the Gulf Breeze case in Florida.

FA: *[perks up]* Yeah.

JM: You take the *MUFON Journal*?

FA: Oh sure, and that's fascinating. I was hoping we could talk about that.

JM: Okay. I have a videotape prepared by a local television station in Gulf Breeze, and it's quite interesting. So I'd like for you to look at that. And then I'd like to discuss the physics of the light source underneath the UFO. Then there's the question of the MJ-12 documents, uh, the Spielberg-Reagan connection...

FA: Spielberg-Reagan?

JM: Yeah. Spielberg is the movie producer.

FA: Yeah, I know. I didn't know there was any connection between them.

JM: Okay. Then I'd like to discuss John Lear and the Groom Lake...

FA: Groom Lear and what?

JM: And the *Groom Lake*.

FA: Groom Lake?

JM: Yes. Groom Lake is the region north of the atomic test site down in Las Vegas. I'd like to discuss...

FA: Who is John Lear?

JM: He's the son of Bill Lear.

FA: The industrialist?

JM: Yes.

FA: Huh. Well, he, well, he's...

JM: [*interrupts*] Then I'd like to discuss Lockheed Corporation and my recent correspondence with the director of the research lab, and the Burbank operations and Colonel Edwards, of, uh, Albuquerque.

FA: Well, in comparison, my proposed agenda looks weak and puny. What I'm primarily interested in is trying to relate, um, the parameters of observations on UFOs to the theory that I'm proposing, and, uh, see if we can gain an insight into how the gravitational field is altered.

JM: This is, this is *precisely* the focal point of my interest.

FA: Well...

JM: It's *exactly* where, where I want to get!

FA: Then this is a very happy circumstance.

JM: And hopefully by the end of our session, now or some extended next week *[sic]*, we might get to the point where I can feel I understand exactly how one should proceed to actually manufacture some vehicles.

FA: Well, there are two aspects of my agenda. One of them is what I already told you. And the other one is somehow to get the resources to do experiments so that we *can* build these vehicles so that we can make our own shuttle vehicles. I think of the UFOs as shuttle vehicles more than anything else.

JM: Is that your opinion?

FA: Yeah. You want to use it?

JM: No. Until I find another one.

FA: Basically, moving around in deep space between aggregations of gravita-, of *mass* is not difficult. If you have enough power, you can just—say you have a nuclear power *[plant]*, you can gather matter anywhere in space, and there's always matter around somewhere, and you heat it enough and push it out in the direction opposite to where you want to go, and you can build up tremendous velocities. But there *is* a problem in getting off of a planet or other gravitational field —uh, *body with* a gravitational field—once you get close to it, and that to my mind is what the basic uses of the UFOs are. That is why you have the mothership and the small ones. The small ones are the shuttle craft. And the big one, I think, is just to travel deep space. It's big—it doesn't have to be small—a small push will move any amount of mass out in deep space.

JM: All right, let's add to the agenda the present work on your experiment so that I can understand what it is you are trying to do with that experiment.

FA: The experiment.... It's very simple. What we have to do is to get some magnets—I think I spoke to you about it on the phone—we have to get magnets of the sort that they have in nuclear magnetic resonance devices. [*gap*] Get a specimen of very pure aluminum...

JM: Which you now have, right?

FA: I have. And it may or may not be doped with chromium or iron...

JM: ...particles. What size particles?

FA: Micron.

JM: Would the normal process involve taking the sample to some machine shop or foundering shop?

FA: I don't think so—just a small piece of it.

JM: Well, what... to have it melted and have the iron inclusions blended in and then rolled...

FA: You can...

JM: ...rolled out in a sheet?

FA: I don't.... Have you ever seen very, very pure aluminum? It's fantastic. It's grayish blue. It's bluish gray—exactly the color that has been reported so often—and it's very soft. All you have to do really is get some of this colloidal iron powder. You can get it from rare metal manufacturers. And, uh, sprinkle it on the aluminum, and it will adhere. If it doesn't adhere enough, you can put it in a vice and squeeze it tight to force the iron into the aluminum—'cause, you know, iron is hard, the aluminum is soft—and that's all that would be necessary. Preparation of the sample is the least of my problems.

JM: What's the form of the sample now? Is it a block? Or...?

FA: No, it's a sheet. About three inches by three inches.

JM: Is it quite thin?

FA: I'd say it's about a sixteenth of an inch thick.

JM: And is that thickness suitable for your test?

FA: Sure. And we put that between the pole pieces of the nuclear magnetic resonance magnets. Now the reason for using those magnets is because the magnetic field is very constant. If the magnetic field varies, then the sample will move through the field. If the iron particles get magnetized, you see, and they *will*, then the whole thing will move between the pole pieces, and if the field is very constant, they will *not* move. Okay? We have to separate the effect we want out from that. So that gets rid of a lot of interference. Then we irradiate the sample with three gigahertz microwave radiation—pulsed. The radiation pulses—I put the characteristics down in the paper that I had...

JM: Yes. Yeah, I thought we ought to compare those numbers in detail with the deductions which I made and published in the last paper.

FA: That is the most useful thing we can do. I picked those numbers because they are physically realizable, for one thing, in terms of present technology, which is a little surprising. And the observations that you reported in your book on UFOLOGY.

JM: Okay, I'm talking now the data that I summarized in that paper on the effects on people.

FA: Yes.

JM: Okay, so that is a rather broad overview that leads to more precise knowledge of the individual parameter values.

FA: Yeah. You gave in that paper the magnetic moment of the UFO. Of course what we're interested in here is not...

JM: I'm talking about the pulse width and the pulse rate.

FA: Oh yes, you did that, too. But we'll have to know the constant magnetic field too.

JM: Okay, we can get some values on that too.

FA: Yeah. That I would like to see.

JM: And I wanted to know what the magnetic field is in these medical, I mean the nuclear magnetic resonance equipment—what field strength is used.

FA: Why, I gave it in here. It is attainable in the nuclear magnetic resonance [*inaudible*]. I think it's somewhere in the neighborhood of a few thousand gauss. If you're talking about empty space between the pole pieces, then that would be *oersteds*, not gauss. *Gauss* is the field inside...

JM: Inside of the object.

FA: In the solid, yeah.

JM: Okay, that's...

FA: Present technology is, *with* present technology—that is what I wanted to emphasize.

JM: Okay. Find in here the reference to the parameters of the electromagnetic field, and I'll go get a copy of my paper—we'll talk about those points, [*pause*] Here are two copies for your sons.

FA: You sent me one.

JM: Yeah, those are for your sons.

FA: Yes, I understand. We'll be seeing them in the next couple of days. *[pause]*

JM: Okay we're talking about exactly the same thing. We have a strong magnetic field.

FA: Here you are.

JM: All right.

FA: 10^6 oersteds. Oh, no, no, I'm sorry. That's "the nucleus experiences a magnetic field." No I don't see it here, but as I recall...

JM: I'll have a look. I read this yesterday *[pages rustling]*.

FA: All I said here is "less than 10^4 oersteds." And let's say something like 4,000 oersteds. And this was at temperatures of less than a tenth of a degree Kelvin. Now of course the experiments that have been done with dynamic nuclear orientation have been done at very low temperatures—a tenth of a degree Kelvin. And the reason is that they wanted to study the relaxation times of the electrons, for example—or the protons, or the nuclei—under conditions where the thermal oscillations, the thermal perturbations, were frozen out. Okay? But otherwise the lifetimes with respect to thermal fluctuations of the nuclear orientation is of the order of...

JM: *[inaudible]* As I recall, having read it. I can't quote what you said about it, though.

FA: Well, it's extremely small. It's microseconds or nanoseconds. Oh, here we are: 10"^{10} seconds.

JM: Your microwave input has to reconstruct...

FA: What is?

JM: The microwave input has to reconstruct energy that's lost—is that you what you said?

FA: No, the point is that the rare earths—of which aluminum is one of the group—are unique in that their lifetime against thermal fluctuations is very long, even at room temperature. It's of the order of 6 *milliseconds*. And that's enormously long compared to 10^{-7} [*sic*].

JM: Yeah it is enormously long. I understand.

FA: That's what makes aluminum unique.

JM: There is the data. I put those marks there yesterday.

FA: Oh yes, here it is. Uh-huh. Fixed magnetic field is 660 oersteds. Pulsed oscillating field at 3,000 megahertz.

JM: Okay, now the pulsed field lasts two microseconds. So that two microseconds is the duration of your pulse. Okay, now let's talk about that. What I found out was that the hearing response had to be between 200 and 3,000 megahertz. That's the cutoff. You're just not going to hear anything outside that bandwidth. So we're okay on the 3,000.

FA: I see.

JM: All right. Now, but I've also found out that the response is, on log paper looks like this.... The human hearing response as a function of the frequency. Here's the frequency. There's a very steep mesa, like that. *[inaudible]* Hertz down here at one....

FA: That's okay.

JM: ...sixty, and a hundred. So that when people are near the UFOs and "hear" the electromagnetic radiation, it's most likely that the pulse width lies between this ten and forty. *[inaudible]* It's most likely, but it wouldn't be possible to hear if it was at the threshold of the hearing capability. So I think the indication is that it's more likely that this is the range.

[Ed note: A long digression on how to interpret JM's hand-drawn chart, which is unavailable, begins here and the tape eventually runs out.]

PART VII

Documents

There is nothing to writing. All you do is sit down at a typewriter and bleed.

— Ernest Hemingway

Chapter 31

A MODEL FOR THE ORIGIN OF THE GRAVITATIONAL FORCE AND ITS CONTROL

IN 2000, I RETURNED to the Bay Area to work with Silicon Valley guru Jef Raskin on a new kind of Internet browser interface that Jef thought would take the world by storm. As is typical in the Valley, the workweeks varied between fifty and sixty hours. What little spare time I had was spent trying to find venture capital to invest in development of gravity control. It soon became evident that I needed a brief but convincing explanation of the technology for an intelligent layperson, so I asked my dad to write an essay that I could use both as a set of talking points and a handout. The result will be found below. Much of the language is repeated here and there throughout *Book II*, but its conciseness and simplicity make it a convenient stepping stone between the preceding chapters and the more complex material ahead. Everything that follows was written by F. Alzofon.

INTRODUCTION

Although the universal gravitational force law was published by Sir Isaac Newton in 1687, the physical process giving rise to the force has remained a topic of speculation down to the present time. The law itself was simple in form: It depended on the masses (quantity of matter) of the interacting bodies and their distance of separation, and a universal constant independent of the nature of the interacting bodies. Contrary to the manner in which most material interactions take place—i.e. by contact between the interacting bodies—the gravitational force is exerted at a distance and does not require contact between the interacting bodies. It is not localized in space.

To be sure, there are other nonlocalized (or field) forces: electrical and magnetic force fields are cases in point. Like the gravitational force, these are nonlocalized and do not require contact between interacting material bodies. Bodies interacting via electrical and magnetic force fields can be shielded from one another (i.e. neutralized) by use of metal screens. In contrast, the gravitational field can *not* be neutralized by use of metal screens.

In the following discussion, we shall present a model for the origin of the gravitational field and a means of controlling the field (i.e. increasing or decreasing the force) using only present technology.

MODEL FOR THE ORIGIN OF THE GRAVITATION FIELD

As mentioned above, the gravitational field occurs in the presence of matter and not otherwise. Moreover, the law of force (and therefore its origin) is the same for an extremely wide range of physical conditions. For example, Newton's law is the same for the force between the Earth and the sun, as well as between the Earth and the Moon. It is also the same for the cold dust in outer space and between very hot or cold stars. Thus it seems reasonable to seek the origin of the force in some feature that matter in all its forms shares in common.

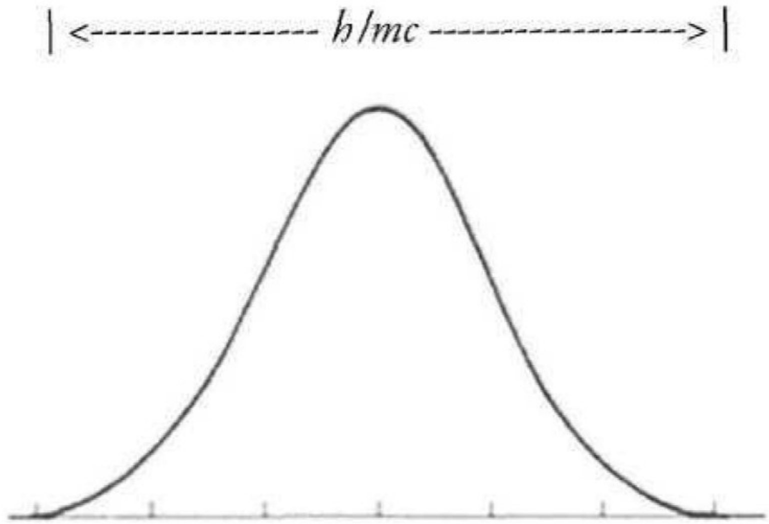
Modern physics tells us that matter is composed of elementary particles with diameters on the order of 10^{-13} cm. These particles exist in a bewildering variety—electrons, protons, neutrons, mesons, quarks, etc.—and since matter is confined to these and does not occur in any other way, these particles must in some way be responsible for the gravitational force. The population of these particles is different for stars and colder bodies like the Earth, yet the gravitational force law holds true irrespective of particle populations, which suggests that we should seek the origin of the gravitational field in some property common to *all* elementary particles, irrespective of type. The model proposed in this essay is that the gravitational force is a result of the *stability* and *internal motion* of all elementary particles.[54]

To see how these two properties are related to one another, let's examine Albert Einstein's famous relation between matter of mass m (say, of an elementary particle) and the equivalent amount of radiation energy mc^2 (c is equal to the speed of light).

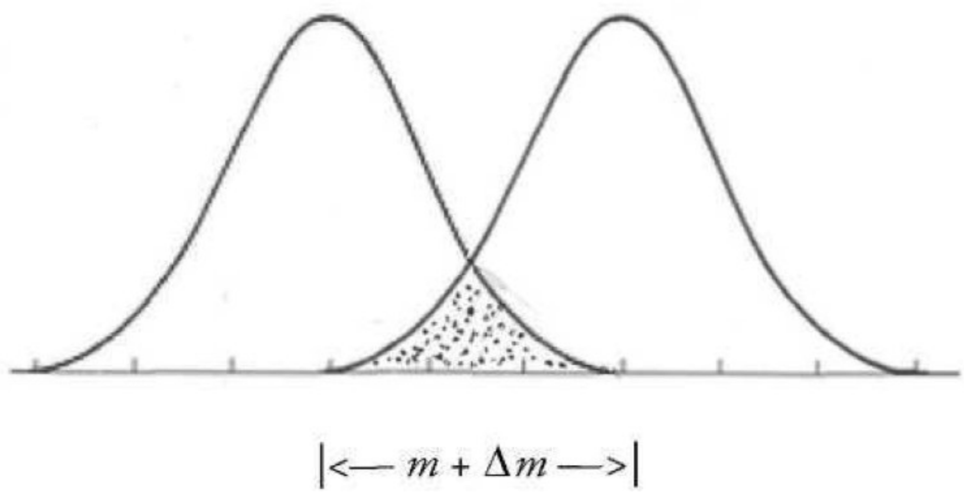
This relation is a way of saying that radiation and matter are equivalent: that is, radiation is dispersed matter, and matter is condensed radiation. On a subatomic scale, this assertion has been proved experimentally: one can be transformed into the other. In turn, this says that every elementary particle has an internal energy of motion of some kind, and this is released when it is changed into radiation. Evidently this internal energy is restrained within a very small region, estimated by the Compton wavelength h/mc, where h is a very small quantity, the *Planck constant*.

There must be two opposing forces acting on every element of an elementary particle: one is the internal motion which tends to blow it apart into a nonlocalized radiation field, and the other a force which holds it together and makes it stable. From the two relations given, something else can be said about the nature of the forces. If m increases, so does the amount of internal radiation-equivalent energy of the particle. But, at the same time, the Compton diameter *decreases* in order to hold the particle together: the restraining forces become larger, too.

The Compton diameter is only an approximation of the extent of an elementary particle. In actuality, the energy of the particle extends beyond this limit. The figure below is a schematic representation of the energy density variation and not to be taken too literally. The height of the curve represents energy density, while the horizontal line at base represents distance. In other words, the energy density increases at the center of the particle and decreases farther away.



The extended field surrounding the particle is asserted to be responsible for the gravitational force. To see how this occurs, consider what happens when two elementary particles are neighbors, so that their extended fields overlap.



Insofar as one particle is concerned—say, the one on the left—it has gained in energy by a small amount, from mc^2 to $(m + \triangle m)c^2$, and the condition for stability has altered from h/mc to $h/(m + \triangle m)c$, or approximately $h/mc - (\triangle m/m)(h/mc)$. That is, there is a tendency to draw the added energy closer to the central portion of the particle. The second particle (on the right) senses this tendency as a force upon it as a whole. When multiplied by the enormous number of particles making up macroscopic matter, this minuscule effect becomes, in aggregate, what we call *the gravitational force*.

ALTERATION OF THE GRAVITATIONAL FORCE

The model proposed above can be used to design a means of reducing—or increasing—the gravitational force. A clue as to how this might be done is that the internal motion of energy within the particle does not cause a wholesale movement of the particle: every motion in one direction is matched by one in the opposite direction. This is characteristic of chaotic motion with zero net-displacement. This chaotic motion can be altered to a systematic swirling motion for some elementary particles, causing an observable magnetic moment, by placing the particle in a magnetic field. That is, in some particles the internal motion that is responsible for the gravitational field can be given a directional property.

Based on an analogy with the adiabatic demagnetization of paramagnetic salts—a process used to lower the temperatures of these salts to a fraction of one degree Kelvin—we can imagine a procedure for lowering the energy density of the gravitational field (and therefore reducing its strength) by making use of *magnetic moments*. First, the process for lowering the temperature of paramagnetic salts, in schematic outline:

Electromagnetic Cryogenic Process (Adiabatic Demagnetization of Paramagnetic Salts)

1. The paramagnetic salt is placed in a constant magnetic field. This orients the molecules of the salt along the direction of the magnetic field due to the magnetic moments of the molecules.

2. The salt specimen then comes to the same temperature as its surroundings.

3. The magnetic field is quickly removed, leaving the molecules of the salt momentarily oriented.

4. The material surrounding the salt, whose molecules are still moving chaotically, interacts with the salt through these molecules, causing the salt molecules to lose their orientation and also move chaotically. In so doing, the surrounding molecules lose energy and become cooler, i.e., their temperature drops. The lower temperature is communicated to the salt specimen.

5. Steps 3 and 4 are cycled over and over, “pumping” heat out of the salts and achieving extremely low temperatures.

Analogously, it is proposed to use a process called *dynamic nuclear orientation* to orient the electrons and nuclei of a suitably chosen material making up the skin of a vehicle. When the source of nuclear orientation is suddenly removed, the gravitational field surrounding the vehicle will restore the oriented elementary particles to a chaotic state and lose energy in the process. This will lower the energy density of the gravitational field and weaken it. Applied cyclically, this process can be used in vehicle propulsion.

Dynamic nuclear orientation is a known technology, but little recognized outside of the physics laboratory. Its use in gravity alteration requires additional equipment and precise application, which explains why gravitational effects have not been observed in connection with it before this time.

EXPERIMENTAL RESULTS

Preliminary experimental tests of this process have been successful in showing that increases and decreases in the weight of a suitable specimen can be generated by a cyclical process involving dynamic nuclear orientation. Results accord with the numerical predictions of the theory. Weight reduction in the vicinity of 80% was observed.

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[54] *Ed note: So much for gravitons.*

Chapter 32

TECHNICAL BACKGROUND

EDITOR'S INTRODUCTION

The following document, dated August 14th, 1982, was written in response to Jim McCampbell's request for a general description of gravity-control technology that could be part of a presentation for potential backers. Eventually McCampbell contacted the Department of Energy *(see pp. 116–117)*, and my father submitted a formal research proposal to the agency. The DoE proposal has been lost, but the following probably represents a draft of at least part of it.

Everything that follows was written by F. Alzofon.

THE NATURE OF GRAVITATION

Newton's gravitational force law has been verified in a variety of laboratory-scale experiments, as well as in its accurate prediction of the motion of heavenly bodies (including interplanetary probes). In general, it is found that, although the gravitational force varies with distance in the same way as electrostatic and magnetostatic forces, it is measured in the laboratory to be much weaker than electrostatic or magnetostatic forces. For example, the electrostatic force induced by rubbing synthetic fabric together (e.g. in an automatic dryer) is easily observed, but the force between two larger masses, owing to their gravitational attraction—for example, between an ocean liner and a passenger on it—is not as easily perceived.

In view of the difficulties of experimenting with the gravitational force, or changes in it, there is at present a better understanding and control of electric and magnetic forces than of the gravitational force. In addition, it has been difficult to relate the gravitational force to other phenomena. Thus, use of the electromagnetic field to control the gravitational force is not yet a feasible technology; indeed, such a use of electromagnetism may have to await the development of a theory which explicitly links known electromagnetic effects to the gravitational field, i.e. a successful unified field theory.

UNITARY AND UNIFIED FIELD THEORY

Attempts have been made to link, in theory, the electromagnetic and gravitational fields. The best known is the unitary field theory proposed by A. Einstein, based on formalistic (i.e.

mathematical) considerations. In general, these considerations always include the notion that gravitation is associated with a geometrical property of space-time. This geometrical property, in turn, is justified by imagined measurements on the path of light signals in a vacuum. Since Einstein identifies the gravitational acceleration with the curvature in the paths traced out by the light rays, there is a very limited use of the properties of light. For example, those properties of light which belong to the subatomic level of observation are not called into play; consequently one may conjecture, on the basis of Einstein's own precepts, that those properties of the physical world on a subatomic scale are not adequately described in the unitary theory.

The theory upon which the following proposal is based, like the general theory of relativity and the unitary theory, depends on the properties of the electromagnetic field. However, the property featured in the proposed theory is not the effect of the gravitational force on the curvature of light rays, but rather the convertibility of matter into radiant energy and its converse. The latter is an experimentally observed phenomenon; the theory shows that it leads to a model, in terms of subatomic processes, for the generation of the gravitational force. Moreover, the model also suggests a method by which the gravitational force can be weakened or strengthened through the agency of electromagnetic interactions between subatomic processes. This method is suggested by an analogy between the cooling of a paramagnetic salt by use of a magnetic field—that is, a common laboratory technique—and the recognized method of dynamic nuclear orientation.

DYNAMIC NUCLEAR ORIENTATION AND GRAVITY REDUCTION

The basic mechanism proposed for reduction of the gravitational field is the "cooling" of the cloud of virtual particles/radiation surrounding a vehicle, and due to the elementary "virtual" particles and radiation surrounding the Earth. Since the gravitational field surrounding the vehicle is due to this cloud of virtual particles and radiation, reduction in the mean energy of the cloud is expected to result in the reduction of the gravitational force on the vehicle.

"Cooling," referred to above, takes place by first ordering the nuclear magnetic moments with respect to a fixed magnetic field. Since part of the magnetic moments of the nuclei is due to virtual processes, the virtual processes will also be ordered to that extent. The atoms of the structural material comprising the vehicle must be chosen so that the virtual particle cloud generated by the Earth (and which is disordered) has enough time to disrupt the ordered magnetic moments of the structure's nuclei, i.e. that part of the magnetic moment due to virtual processes. Moreover, the latter disruptions must occur before disruptive thermal processes intervene to ensure that it is the Earth's virtual particle field which is interacting with the nuclei, not local thermal processes. In the process of this disruption, it is expected that the virtual processes constituting the Earth's gravitational field will lose energy in the neighborhood of the vehicle, reducing the gravitational force on the vehicle.

Candidate materials for construction of a vehicle are governed by the observation that it is possible to orient the nuclei of a ferromagnetic element by the method of dynamic nuclear orientation. This method takes advantage of the fact that the electrons of these atoms are easily affected by a magnetic field. A constant magnetic field is first applied to the atoms of the material, causing the electrons to precess with a frequency proportional to the field strength. An oscillating magnetic field is then applied at right angles to the first magnetic field, with the same frequency as the precessional frequency of the electrons. The oscillating field need not be a strong field since, in general, a weak periodic disturbance can have a very large effect when applied to a physical system with the same natural frequency as the applied force. In the present case, the applied oscillating magnetic field tips over the precessing electrons' magnetic moments, thus aligning them with a far greater yield of common orientations than is possible with a much stronger constant magnetic field.

Moreover, since the electrons are very close to the nuclei of the atoms, the magnetic coupling between them acts to align the nuclei also.

It has been observed that it is possible to pass this nuclear orientation of ferromagnetic atoms to non-ferromagnetic atoms by immersing the ferromagnetic atoms in a matrix material such as aluminum. It is also found that at liquid helium temperatures, or near that temperature, the length of time the aluminum nuclei remain oriented is longer by a factor of about ten than the length of time the ferromagnetic nuclei remain oriented. Although the orientation lifetime becomes shorter, with respect to thermal processes, as the temperature of the surrounding medium rises, experimental data suggests that the lifetime at room temperature will remain long enough to serve the purpose of reducing the gravitational field.

CONSTRUCTION OF A VEHICLE

The combination of iron inclusions in aluminum is an especially attractive one for vehicle construction, for structural strength and ready availability of the metals. Although the resonance condition is difficult to maintain over a large spatial extent, one can imagine a small sample of iron immersed in a small sample of aluminum acting as a generator of the ordered state which is then conducted to the outer shell of the vehicle by means of aluminum cables. Once having reduced the gravitational force, other means of propulsion, such as Vernier rocket motors in space or in an atmosphere or propellers (in an atmosphere), can be used.

The advantages over rocket propulsion alone inherent in the proposed means of propulsion are:

a) A lower speed of takeoff from a planet, with consequent lower fuel consumption rate

b) A longer period of acceleration between planets, as well as a longer period of deceleration, leading to a shorter transit time

c) Vastly greater maneuverability

In addition, reaction mass can be collected along a given trip (e.g. if a nuclear reactor power plant is used) and extended trips of long duration become possible, without great dependence on home base for refueling or supplying reaction mass.

EXPERIMENTAL PROGRAM

As indicated in the above discussion, there are several areas which have not been verified by experiment. It is therefore necessary to institute an experimental program to eliminate these areas of ignorance before beginning on a vehicle construction program.

Most prominent of the unverified predictions is the relationship proposed between virtual processes and the gravitational force. Such experiments should first be performed at low temperatures to avoid interference from thermal effects. The dependence of the phenomena on temperature can then be determined, so that the feasibility of the proposed method of propulsion at elevated temperatures can be determined.

The most efficient combination of iron/aluminum, iron/magnesium, chromium/aluminum, and chromium/magnesium must be determined from theoretical analyses and laboratory tests.

Strengths of constant magnetic fields and microwave field should be determined for optimum performance, as well as the optimum microwave frequencies for given fixed magnetic field strengths.

Chapter 33

THE UFT AND THE STR

EDITOR'S INTRODUCTION

The unified field theory (UFT) is predicated on a minor correction to Einstein's special theory of relativity, a step that has engendered a bit of controversy over the years. "If it ain't broke, don't fix it," one physicist told me, and then, apparently believing he had dealt a crushing blow to the pretentions of "The Unity of Nature," my father's most comprehensive paper on the UFT, he handed it back and disdainfully refused to read it.

I asked my dad what he had to say about this criticism. The answer went something like this: "In exchange for a simple correction to the STR, I get unification of the fundamental forces, a solution to the wave/particle problem, elimination of infinities from field equations and quantum electrodynamics, and an operational definition of the gravitational force that yields engineering applications. Seems like a reasonable trade to me."

Misunderstandings about his motivations for modifying the STR arose often enough, however, to prompt him to write the following unpublished addendum to the 1981 paper. His 2001 paper, "Light Signals, the Special Theory of Relativity and Reality" may also have been written in response to this issue *(**see Appendix C, Ref. 7, p. 349**)*.

The rest of this chapter was written by F. Alzofon.

INTRODUCTION

It is the purpose of this addendum to clarify the relation of the unified field theory (UFT) proposed in the paper "Anti-Gravity with Present Technology: Implementation and Theoretical Foundation" (AIAA-81-1608) to Einstein's special theory of relativity (STR, or *special theory)*. It is proposed below that the UFT is a natural outgrowth of the special theory and is not a totally new beginning.

It is a consequence of this fact—the natural outgrowth of the UFT from the STR—that the UFT reduces to the special theory in the appropriate context, that is, it makes the same predictions as the special theory wherever the special theory is valid. However, the UFT extends the special theory to the region of high-energy processes where matter and radiation can be transformed into one another. Moreover, the UFT offers a means of removing troublesome and physically unrealistic infinities from the Coulomb-type laws that are valid for static fields (and low-energy processes), as well as those that occur in quantum electrodynamics. The latter features are not possible with the special theory in any direct manner.

Finally, the UFT provides a clear connection between the origin of inertial mass and the radiation field and a similar relation between inertial and gravitational masses. The special theory does not offer any such direct connections.

THE LIGHT SIGNAL

One of the central concepts introduced in the special theory is the notion of the light signal used for distant clock synchronization. There are, however, some assumptions made in the course of the clock synchronization procedure that must be altered in the light of present-day, improved knowledge of the properties of the electromagnetic field.

It is advisable, in this connection, to review the assumptions that lie at the root of Einstein's distant clock synchronization, since these are not always made explicit.

The use of the imaginary "observer" who is the agent for establishing a space-time coordinate system sometimes disguises that one is concerned here, not with a formal mathematical process, but with a real radiation field with experimentally determined properties. At minimum, this fact appears in the occurrence of the experimentally determined speed of light everywhere in the theory, even in the example used in Einstein's original paper on the special theory, in which the collision of two elastic spheres was invoked. That is, although the special theory was formulated to explain how material bodies interacted through the electromagnetic field, there was no mention of the electromagnetic field as a means of interaction in the latter example.

This feature could either be explained as due to the observer's use of the field for signaling, or to the fact that every material body interacts through the mediation of an electromagnetic field and in no other way. For example, in later developments of the special theory which se the Minkowski metric, it is pointed out that two events which cannot be connected by a light signal cannot affect one another at all, clearly a statement about the interaction of any two bodies. The latter is a statement about physical systems interacting, not about observers. Another example we can cite is the derivation of the Lorentz force from the Coulomb static electric field expression by use of the Lorentz transformation; the intervention of passive observers cannot be imagined to affect the accuracy of this description.

It is remarkable that only one experimentally determined parameter, the speed of light, is enough to yield all of the above-varied results. But it is as a result of an experimentally determined property of the electromagnetic field, and not of a mathematical concept alone that all these advantages are available. If there are other properties of the real radiation field which have a bearing on the interaction of material bodies, surely these ought to be included in any considerations leading to a theory describing these interactions. These properties must figure in every such interaction to be of value.

There is, however, more to the special theory than distant clock synchronization.

In the special theory, it is assumed that a light signal preserves its identity when observed by observers in relative uniform motion (i.e. moving with constant relative velocities). It is agreed that not all properties of the light signal remain invariant; for example, the frequencies (colors) composing the signal do change owing to the Doppler shift. But in terms of the idea of a light signal as a means of material body interaction there is a difficulty, for the interaction of two bodies may indeed depend on the frequency content of the mediating fields. Thus, as a physical entity, the light signal is, even in the context of the special theory, not an invariant.

Returning again to the special theory, the fact that the light signal retains its fundamental character to each observer (material system) as light, with a *characteristic speed of propagation*, is recognized by requirement that each observer that each observer sees the signal to be traveling with the same velocity, *c*, whatever their relative velocities. The consequent apparent contradictions in their interpretation of their measurements is resolved by the use of the Lorentz transformation: a dictionary which they can use to reconcile their differing sets of numbers used to describe the same physical event. More than this, the latter principle (of covariance) is extended to the assertion that the equations of motion for particles and radiation must have the same form in every observer's coordinate system.

Thus, by excluding all properties of matter and radiation except the speed of light alone, we can avoid the difficulty pointed out above in connection with the Doppler Effect. But where additional properties of the real radiation field might have a drastic effect on all interactions, *these properties cannot be ignored*.

MODERN VIEW OF THE RADIATION FIELD

Quantum electrodynamics has shown that the Maxwell electromagnetic field is not an adequate description of the real radiation field. In order to bring the predictions of theory into agreement with experiment, it was necessary to assume that the vacuum of classical theory was altered to contain an "infinity" of energy, with corresponding creations and annihilations of radiation and particles. This formal device had a precedent at the outset of the quantum theory in attempting to incorporate the possibility of the "spontaneous" radiative transitions which Einstein had found it necessary to introduce in his statistical analysis of black-body radiation.

Thus, a light signal passing through this infinite sea of energy could hardly avoid being altered in a fundamental manner: an alteration that would not become evident until a scale of measurement suitable to observe such effects was adopted. Such a scale of measurement was used in the observation of the Lamb-Retherford effect.

On the other hand, since Einstein has adopted the point of view that the vacuum possesses a structure determined by light signals used to probe it, this structure (or metric) must also be altered by the creation and annihilation processes introduced on the basis of accepted modern theory.

But it would be far more believable to ascribe the alteration in the interaction of material bodies, not to a vacuum occupied by an infinite amount of energy (a contradiction in terms), but to an intrinsic property of the radiation field. This is not without precedent: the radiation field is known to undergo fluctuations that, in principle, may become infinite, although with decreasing probability (on the basis of classical radiation theory).

It has been the approach of the UFT to incorporate all the above phenomena into the structure of space-time in a manner that familiar ideas and methods can be used as a practical matter of convenience.

SUMMARY

The above qualitative discussion has been offered as a means of justifying in more detail the development of the UFT in the referenced paper. It is emphasized that only well-established ideas and properties of the radiation field have been used; they have simply been combined in a different manner, e.g. the dispersion theory approach.

Chapter 34

THE 1989 GRANT PROPOSAL

EDITOR'S INTRODUCTION

The following is a composite of material from three drafts of a proposal that was ultimately sent to a nonprofit research foundation. The '89 proposal was written after the lost DoE proposal, and no doubt contains improvements. The idea behind combining material from all three drafts was to avoid repetition while presenting the best from each.

The proposal emphasizes new forms of energy production because that was the foundation's primary area of interest. The discussion follows a problem/solution format: First, the physics problem is broadly stated, then the focus shifts to gravitation and how gravity control research will improve the outlook for clean energy.

The general problems in our current understanding of gravity are outlined, and the UFT is offered as a credible solution. The rationale for the experiment follows, with a much more detailed description of the technology than anything presented so far in *Book II*. A list of required equipment follows, with prices updated for the present day (2017).

Chapter 35

GRANT PROPOSAL

August 14, 1989

A Program to Develop New Sources of Useful Energy
Phase I – Controlling the Gravitational Force

INTRODUCTION

The following proposal will concern Phase I of a program to develop new methods of generating useful forms of energy. The primary distinguishing feature of this program is the use of a unified field theory providing a new model of the physical universe, which is formulated in terms of easily visualized and accepted concepts that are readily amenable to experimental tests.

One such test is the use of the theory and its physical model to originate devices for the control of the gravitational force. Phase I of the program will concern an experiment to demonstrate the feasibility of altering (weakening) this force. The discussion and analysis that follows presents a rationale, schedule, and costs for the experiment. Some practical uses of the process are indicated.

GENERAL TOPICS

• Energy Generation

A problem of great general and topical interest is the discovery of new forms of useful energy generation. The publicity given to recent claims of accomplishing cold fusion,[55] and the ready appropriation of large sums of money by a state legislature for future research is a demonstration of public perception of the importance of this question.

• **Gravity Control**

The second problem to be discussed is the control of gravitation. In the discussion to follow, control of gravitation will refer to alteration of the physical mechanism producing the gravitational force. It does not mean the introduction of a force in addition to the gravitational force that may be directed either opposite to, or in the same sense as the gravitational force.

BACKGROUND

• Energy Production[56]

Since energy cannot be created or destroyed, the "production of energy" is a term which must refer to the conversion of one kind of energy into another, and useful, form of energy. Often the conversion takes the form of transforming a potential energy into a useful kinetic energy. For example, potential gravitational energy is transformed into electrical energy by use of falling water, or a gas under pressure may expand to cause motion of a piston.

Approximately characterized, the history of energy generation has progressed from an original dependence on natural sources such as muscle and wind power, etc., to use of exothermic chemical reactions, then to production of electrical power, and finally to production of subatomic reactions (nuclear reactors, fusion, etc.). In general physical terms, this progression has been toward reliance on physical processes involving energy stored in smaller and smaller entities and greater power yields. But in each case, finding a useful energy transformation depends on knowledge of particular details of a specific process which makes the desired energy conversion possible. Only experiment can disclose these details; however, experiments cannot proceed without an adequate theory to guide the way. This theory must tell how to convert the random (or probabilistic) motion of atomic and subatomic entities to macroscopic, ordered motion for extraction of useful work.

At this time, further progress in employment of subatomic processes for extraction of power is hampered by lack of understanding of subatomic processes. Although much is known from experiment, the theory of such processes is admitted to be inadequate. This lack of complete understanding is illustrated by the numerous infinities that result from modern theory, e.g. the concept of an infinite amount of energy stored in a "vacuum."

It has been hoped that discovery of a unified field theory will resolve the difficulties inherent in present models of reality; it is the writer's contention that his unified field theory accomplishes this role, and will show how the desired energy conversions can occur.

• Gravity Control

The usefulness of gravity control is easier to understand at present than before the space exploration programs began. It is certain now that anyone who can offer a practicable scheme for controlling gravitation is certain to profit from government contrasts, at minimum. In addition, civilian organizations are certain to follow suit, leading to extensive space colonization shortly afterward. The latter will be desirable to relieve population pressure on resources, for example.

It is also expected that practicable reduction of the weight of large objects of commercial value will make it possible to transport them without fitting them into containers to be moved on common carriers.

At present the launch of rocket vehicles is strongly dependent on wind and weather because rockets are not readily maneuverable at the high launch speeds (i.e. escape velocity) required with vehicles propelled only by rockets. With gravity control, the amount of rocket fuel carried by these vehicles can be reduced and the launch velocity can also be reduced, leading to greater maneuverability of the vehicle; this same maneuverability will also lead to more easily accomplished exploration of the solar system and planetary bodies. With use of a nuclear reactor, materials found in space can be used for vehicle propulsion, greatly extending the operating range of the vehicle. In addition, it will then be possible to accelerate during the first part of any trip, and decelerate during the second half of the trip, materially reducing the total time required for the trip.

GRAVITATION

• Choice of Model

At present, no clear model of the physical processes giving rise to the gravitational force is generally accepted. Since the unknown provides an open invitation to speculation, a great number of theories have been advanced to explain the origin of the gravitational force. Many of these theories claim the possibility of eventual control of this force. How, then, can anyone distinguish between promising and unpromising proposals when so many kinds are offered? I believe the criteria of the scientific method provide a good and practical guide to how to choose a useful line of investigation.

• The Scientific Method

There are several definitions of what science is. For example, mathematics is often claimed to have no relation to the real world, but it is agreed to be a science. I am here, however, limiting the discussion to physical science, for which experiment, as well as theory, are necessary complements. With this understanding, the scientific method, as Galileo and Newton would have defined it, is comprised of the following steps:

1. A correlation between physical events is observed in Nature.

2. A theory is proposed to explain how these correlations occur.

3. The theory is tested by experiment.

These are hardly enough to describe how physical research is practiced, although the above three steps are often the only three listed. In addition, we must add the following criteria:

4. The theory must provide *numerical* predictions; experiment must verify them *numerically*.

5. The theory must contain the successful theories of the past as special cases.

6. The concepts used by the theory must lend themselves in a convenient manner to experimental design and interpretation. The scientific method is a *social* enterprise.

7. The theory must be easier to use than competing theories.

8. The theory must be falsifiable, that is, *refutable:* It must be possible to conceive of an observation that would prove the theory, or a hypothesis derived from the theory, false.

The writer has formulated his unified field theory to conform to the above requirements for a scientific theory; experiments are now needed to test it.

• **Identification and Significance of the Problem**

The force of gravitation is ubiquitous: on Earth and everywhere in the Universe. Nothing can shield matter from its effects. The strength of the force is steady, strictly proportional to mass and independent of the chemical composition or state of matter. It influences the growth of plants and animals in an essential manner and is required for the continued health of the human body. It has to be taken into account in every task performed in everyday life, as well as in the manufacture of high-technology products. Heavy industry makes use of it without much thought given to its necessity (e.g. in pouring molten metal). Space exploration and placing satellites in orbit are largely a matter of overcoming gravitational attraction for the vehicle being used; Newton's Universal Law of Gravitation is routinely used to plot orbits for exploration of the planets. The same Law is also useful to the military for predicting the course of artillery shells. Other uses can be conceived.

Yet, in all of the above applications of the understanding of the role of the gravitational force in human affairs, there is no perception of how the gravitational force arises, of what physical processes originate the force of gravitation. As a consequence, severe limitations are placed on all enterprises that must take this force into account. For example, very large quantities of rocket propellant must be used to free any vehicle from the Earth's gravitational field, and, as a consequence, there is little propellant remaining for maneuvering within the field in case of bad weather or for unforeseen circumstances in a trip to the Earth's moon and return. Similar difficulties prevent extended exploration of the planetary system by manned rocket vehicles; the expense and awkwardness of mission planning rises rapidly with the distance to be traveled. Colonization of the Moon and the planets is severely hampered by such considerations. Understanding the origin of the gravitational force and its control can be expected to facilitate space exploration and exploitation. In addition, closer to home, we can expect that completion of tasks on the Earth's surface which may be hindered by the gravitational force can be facilitated by an understanding of its origin and control.

• **Attempts to Discover the Source of Gravitation**

The gravitational force is so omnipresent that it was taken for granted until Newton formulated his Law in the late 1600s. Previous to that time, the planets and stars were thought to be placed in the heavens and moved according to divine mandate. After the publication of Newton's Law in 1687 and its subsequent verification by many observations, many theories have been suggested for the origin of the force. However, none of these theories have been translatable into means of controlling the force, as has been the case for electric and magnetic forces.

The perception of the importance of this control has become more acute with increasing activities of world governments in space. For example, in the late 1950s the Soviet scientist Kirill Petrovich Stanyukovich claimed to have solved the problem of the physical mechanism for the origin of the gravitational force and claimed that, as a result, he could easily construct spaceships to navigate space. The U.S. Air Force, concerned that this might be true, funded a study of the state of understanding of gravitation on an international scale (i.e. not restricted to Soviet studies of gravitation) which was published in 1960.[57] It was the conclusion of the writer of the study, Dr. Maurice Garbell, that none of the theories described to that date, with the exception of one,[58] appeared to be capable of engineering realization, again reflecting a lack of understanding of the physical mechanism giving rise to the gravitational force.

The survey underscores the fact that despite great advances in the understanding of subatomic phenomena, and of cosmology, gravity has stubbornly resisted a cause-and-effect explanation in terms of known physical phenomena.

Since the publication of Dr. Garbell's survey in 1960, increased emphasis has been placed on the role of a unification of gravity and other forces, and, indeed, if the objective is to eventually control the force of gravitation, it will have to be done through its dependence on other phenomena and forces. Moreover, in the contest of modern physical theory, in order to be convincing, this dependence must be stated in terms of a theory that is relativistically covariant, i.e. containing physical laws that have the same expressions for every acceptable coordinate system: this is required by the special theory of relativity. The latter property is necessary in order that relative motion not introduce effects that are essentially new; for example, an electric charge that generates a purely electrostatic field when at rest relative to an observer, will be observed to also generate a magnetic field when in relative motion with respect to an observer: this feature must be included in any credible theory.

To summarize: a frequent theme in the attempt to explain gravitation in terms of familiar concepts is the effort to construct a relativistically covariant theory which describes a unified field: a field which relates the gravitational field to other, well-known fields. Thus, such a theory should include what is known about the electromagnetic field, gravitational field, quantum mechanics, the equivalence of matter and radiation, and can be extended to subatomic phenomena. When such a theory exists and also indicates how gravity can be controlled, it is necessary to perform experiments to verify its predictions.

It is asserted that such a theory now exists.[59] Moreover, since it includes classical and relativistic particle mechanics, electromagnetic fields, the classical gravitational field, a clearly visualized model of inertial and gravitational mass, the equivalence of matter and radiation, quantum mechanics, and a means of extending the theory without infinities to subatomic processes, the theory has been verified in part by thousands of experiments, and therefore *must be considered to be an extension of present technology, and already partially verified by experiment*.

Moreover, the basic ideas are not new but well accepted, although they are put together in an essentially new way. In addition to the foregoing, we must consider the theory under discussion to be *more realistic than presently accepted theories* since the potentials of the fields characteristic of the theory do not possess any infinities, e.g. like the Coulomb potential and the static gravitational field (Newton's Law). Another, more realistic feature of the theory is the lack of an infinite zero-point energy.[60]

In sum, since the proposed theory agrees with most of present technology, and is more realistic than much of modern theories, there is an excellent chance that those parts of it that have not yet been tested by experiment will *also* be relevant to reality and correct. This is the opportunity offered by the proposed program. A further indication of the importance of this opportunity has been afforded by the remark of the writer of *Soviet Research on Gravitation*,[61] that, "Out of all the theories reviewed, [i.e. to the date of the publication] the theory advanced in *The Origin of the Gravitational Field*[62] is the only one that appears capable of engineering realization."

PHYSICAL BACKGROUND – OVERVIEW

• Origin of the Gravitational Field

Briefly summarized, the unified field theory model[63] holds that the origin of the gravitational field is due to fluctuations in forces which are already known to exist (e.g. electromagnetic forces) and to the stability of elementary particles comprising ordinary matter. The UFT is discussed in more detail in the next section below.

• Method of Altering the Gravitational Force

By analogy to the case for the adiabatic cooling of paramagnetic salts, it is expected that the force called into play by the latter fluctuations should be reduced by compelling the fluctuating field to do work against oriented nuclei and electrons of suitably chosen materials. The orientation can be accomplished by dynamic nuclear orientation utilizing a constant magnetic field and a microwave field applied to the specimen. Alternately applying and cutting off these fields is expected to reduce (or, with different timing, increase) the gravitational force on the specimen. A more complete rationale for the experiment is given below.

THE UNIFIED FIELD THEORY MODEL

In order to understand the rationale for the experimental design to be proposed, it is necessary to discuss the model to be employed for visualizing the origin of the gravitational force.

The theory in Refs. 2, 3, and 4 emphasizes the role of fluctuations in the energy density in the region (assumed to be a vacuum) between any two objects exerting a gravitational force on one another. The gravitational field is conceived to be generated by these fluctuations, although the field, on a terrestrial scale of measurement, appears to be unchanging in time, i.e. it is a static field. Thus, the average effect of the fluctuations is Newton's Law of Gravitation:

$$F = \sqrt{G}\ M\ \sqrt{G}\ m/R^2 \text{ (dynes)} \tag{1}$$

where G is the gravitational constant (6.67 x 10^{-8} dyne cm^2 gm^{-2}), M and m are the masses of the interacting bodies, and R is the distance between them (cm). For our purpose, the distance between the objects is considered to be measured between the centers of spheres, if the objects are extended bodies (e.g. such as the Earth), or to the point at which an elementary particle is located (assumed to be, essentially, a point mass). The force F is exerted by one object upon the other and is attractive.

Briefly summarized, the origin of the gravitational field is held to be due to fluctuations in forces that are already known to exist (e.g. electromagnetic forces) and to the stability of elementary particles comprising ordinary matter.

The basic premise of the model is that, since the electromagnetic field is observed to undergo fluctuations in intensity, and since it is the determinant of the space-time metric, and cannot be described in terms of itself, this feature of the field must be included as part of the structure of space-time. When the mean motion of a feature of the field is zero, nothing but fluctuating motion remaining, this constitutes the definition of a mass particle. Moreover, since the particle is described by a field, it is not localized at a point (like the Newtonian particle, or the point masses described above), but owing to its stable existence, most of the field is localized to a region of the diameter of a Compton wavelength: h/mc, where h is Planck's constant (6.6 x 10^{-27} erg sec), m is the mass of the particle in gm, and c is the speed of light (3.0 x 10^{10} cm sec^{-1}). If two such particle fields interact, the fields overlap and any given one of the particles gains energy and therefore mass: the mass increases, say, from m to $m + \triangle m$. As a consequence, the region in which most of the mass-energy is concentrated becomes $h/(m + \triangle m)$, or approximately $(h/mc)(1 - \triangle m/m)$, i.e. less than before. Since the particle has no way of distinguishing between its original mass energy and that contributed by the other particle, it tends to contract and to pull on the energy contributed by the other particle, drawing the other particle toward it in the process. This is an example of a general principle, *Le Châtelier's Principle*, which asserts that if any physical system is in equilibrium and there is a small change in its state, then the system will alter in such a way as to restore the state of equilibrium. In this case, the given particle acts to restore a condition in which the new Compton wavelength characterizes the diameter of the central region of mass-energy.

A further consequence of the unified field theory is that no fluctuations of the energy in a vacuum need be invoked; there is no infinite quantity associated with the zero-point energy in a vacuum. Indeed, there is no infinity associated with any quantity appearing in the theory. For example, the force F in equation (1) tends to infinity as the distance between the interacting masses tends to zero; in the unified field theory, Newton's Law can be derived in the form (1), but it is shown that as R tends to zero, the force law changes to a different form that does not become infinite as R tends to zero. Moreover, the property of inertial mass is itself shown to be a consequence of the fluctuating motion of the field: to the extent that the field participates in the fluctuating motion, to precisely that extent the field has the property of mass inertia. In addition, as a result of this model, the notion of "virtual" charges $\sqrt{G}\,M$ becomes understandable as real charges and an integral part of the unified field. For example, since the energy density of the gravitational field is given by:

$$(1/8\pi)\,(\sqrt{G}\,M/R^2)^2 \text{ ergs cm}^{-3} \tag{2}$$

(derived in a manner analogous to the electrostatic energy field density), we may estimate the number of equivalent charged particles in the field at the distance R from the source mass M, assuming most of them to be electrons (since these require the minimum energy in the creation-annihilation process for *particles;* photons require less minimum energy):

$$(1/mc^2)\,(1/8\pi)\,(\sqrt{G}\,M/R^2)^2 \text{ ergs cm}^{-3} \text{ particles} \tag{3}$$

where m is the mass of the electron (9.1×10^{-28} gm). Thus, at the Earth's surface (R = radius of the Earth = 6.4×10^8 cm), the energy density is about 5.7×10^{11} ergs cm^{-3} to one significant figure. Since the rest energy of an electron is 8.2×10^{-7} ergs, an order of magnitude estimate of the number of charges in the Earth's gravitational field at the Earth's surface is about 7.0×10^{17} electron charges per cubic centimeter, also to one significant figure. *These are equivalent charges and do not have a long-term existence; they are a consequence of creation-annihilation processes*.

RATIONALE FOR THE EXPERIMENT

Since the existence of the gravitational field is identified with the existence of the fluctuating motion of the energy in the field, then reduction in the fluctuating motion should reduce the intensity of the field and reduction in the force F in equation (1).

An analogous situation exists in the use of a magnetic field to reduce the temperature of a paramagnetic salt. In the latter process, a magnetic field (constant) is applied to a specimen of the salt, orienting the elementary molecular moments of the salt. After thermal equilibrium is established, the magnetic field is suddenly removed, and the immediate surroundings do work on the oriented magnetic dipoles, losing some of their random motion in the process, while causing the dipoles to lose some of their orientation, and thus causing a temperature drop in the neighborhood of the salt.

We propose to reduce the random motion in the gravitational field in an analogous manner by use of dynamic nuclear orientation, a well-established technique of physical research.[64]

In principle the method of dynamic nuclear orientation is easy to state; its purpose is to orient nuclei of atoms instead of molecules of a paramagnetic salt, but the method of orientation is similar. Thus, a constant magnetic field is imposed on a specimen of a ferromagnetic material, causing the electrons of the atoms to precess about the direction of the field with a characteristic (Larmor) frequency. A relatively weak magnetic field which varies at the Larmor frequency is then applied to the specimen, causing the electrons to tip over and become oriented. To preserve the angular momentum of the specimen, the nuclei must also tip over and become oriented. This process usually is carried out at liquid helium temperatures to eliminate the effect of thermal disruption of the orientation, so that studies of nuclear properties can proceed without interference from many thermal collisions with surrounding atoms. For ferromagnetic atoms, once the oscillating magnetic field is removed, the orientation decays more or less rapidly, depending on the temperature of the heat bath in which the atoms are immersed; for room temperature, the decay time is less than a microsecond, so that the experimenter cannot perform any of the experiments we have in mind with such conditions.

Fortunately, a device can be used which results in longer-term nuclear orientation at room temperature. It has been found that if ferromagnetic atoms are thinly embedded in a rare earth element (e.g., iron or chromium embedded in aluminum or magnesium) the ferromagnetic nuclei can again be oriented and will impart their orientation to the rare earth nuclei. In turn, it is found that the orientation of the rare earth nuclei will last for as much as 6 milliseconds after the oscillating magnetic field has been removed.[65]

The above considerations indicate how an experiment designed to show how the force of gravity can be altered (i.e. weakened) can be performed:

A small specimen of aluminum (very pure to avoid interfering resonances from isotopes) with a small amount of colloidal iron powder inserted into it (easy to do since the melting points of aluminum and iron are so different) is placed in a magnetic field of about 2000 oersteds. A microwave field is applied to the specimen at the Larmor frequency (determined by the strength of the magnetic field) and observations are made to see whether or not the weight of the specimen has been altered. There must be a means of verifying that resonance of microwave and natural electron precession frequency is maintained: this will be a critical part of the experiment. It is proposed to sample the resonance at 6 millisecond intervals; indeed, the microwave field will be turned on and off at 6 millisecond intervals, each microwave pulse to last for a few microseconds to preserve nuclear orientation. The latter proposals are based on the following observations. In these observations, we shall refer to the fluctuations in energy (including creation and annihilation of radiation photons and of particle) as “virtual” processes. The term was common in the quantum electrodynamics where these processes were thought by some physicists to be a convenient formal device, although at least one paper advanced the opinion that they were real.[66] *Ref. 8*, by Dr. H. E. Puthoff *(p. 268)*, also emphasizes the reality of such processes.

From observations on gravitational fields, it is evident that “virtual” processes have the following properties:

a) Since the net effect of two gravitational fields at a given point is simply the sum of the two fields (i.e. they do not interfere with one another), it follows that “virtual” photons/particles interact very weakly.

b) “Virtual” photons/particles interact strongly with matter.

c) Any given mass does not recognize a distinction between the “virtual” photons/particles it generates and the photons/particles that a mass interacting with it generates.[67]

THE PHYSICAL MECHANISM FOR THE REDUCTION OF GRAVITATIONAL FORCE

The reduction of the gravitational force by the means proposed above is imagined to occur in the following manner:

Upon orientation of the aluminum nuclei and electrons, the “virtual” processes owing to both the Earth and the aluminum nuclei and electrons give rise to charged particles which are oriented owing to their strong interaction with the oriented magnetic moments. This gives rise to a contribution to the net magnetic moments of nuclei and electrons; in the case of the electrons the additional magnetic moment has been calculated by the methods of the quantum electrodynamics and found to generate the fractional alteration:

$$\frac{\mu_e - \mu_0}{\mu_0} = 0.0012 \qquad (4)$$

where the subscript o refers to the original magnetic moment of the electron, and the subscript *e* refers to the magnetic moment including the effect of creation and annihilation of charges. We shall assume that the same relation applies to the magnetic moment of the aluminum nuclei, for lack of a better value; since the magnetic moments of aluminum nucleus and electron are in the ratio of 5 to 1,[68] it is likely that a greater fractional alteration occurs for the nucleus.

The frequency of the microwave field used for tipping the nuclei is given by:

$$\nu = g\mu_B H/h \tag{5}$$

where g is the spectroscopic splitting factor for the electron, μ_B is the magnetic moment of the Bohr magneton, and h is Planck's constant. Typical orders of magnitude are $g \approx 3$, $\mu_B \approx 10^{-20}$ erg/oe. The alteration in the magnetic moment induces a change in the above frequency, with an attendant alteration in the energy given by multiplying the above relation by h. Using the value of the magnetic moment for a proton (i.e. $eh/2M_p$, where M_p is the mass of the proton), or 5.1×10^{-24} erg/oe, we estimate the effect of the alteration to be:

$$\Delta E = g\,(5.1 \times 10^{-24})\,H\,(0.0012) \tag{6}$$

Since, for a paramagnetic ion, the nucleus experiences a local magnetic field of about 5×10^{6} oe[14], $\triangle E \approx 9.2 \times 10^{-20}$ erg. The frequency interval associated with the latter quantity is then $\triangle E/h$, or about 1.4×10^{7} Hz and the complementarity of frequency and time intervals implies a lifetime for the oriented "virtual" state of about 7.1×10^{-8} sec. It follows that the lifetime of the "virtual" states in question are very much shorter than nuclear orientation thermal lifetimes. A pulsed oscillating field will therefore serve to keep the paramagnetic nuclei oriented insofar as thermal decay is concerned and, properly timed, will allow that part of the magnetic moment due to "virtual" processes to become disordered.

The disordering referred to above occurs as follows: since, owing to the properties of "virtual" processes listed in (a) to (c) in the "Rationale for the Experiment" above *(p. 255)*, a given nucleus cannot distinguish between those "virtual" photons/particles it generates and those contributed by, say, the Earth's gravitational field. It will therefore orient that part of the gravitational field's contribution in which it is embedded. As the cycle of alternate application and cutoff of the microwave field is repeated, a cloud of oriented "virtual" photons/particles is built up around the aluminum specimen and diffuses outward, limited by mean free path and lifetimes of the "virtual" states.

The constant magnetic field and frequency of the oscillating field can be selected to conform to the values often used in dynamic nuclear orientation. For example, with a fixed magnetic field H = 660 oe, one can employ a pulsed oscillating field of 3000 MHz, with pulses lasting 2 microseconds and a repetition rate of about 6 milliseconds. The cutoff of the oscillating field allows the cloud of oriented "Virtual" photons/particles to diffuse outward from the nuclei of the aluminum specimen, to be replaced by more oriented photons/particles, thus building up the extent, and the gravity-reducing capability of the cloud.

In accord with the model indicated in the foregoing discussion, the amount of e.g. iron, particles inserted into the aluminum metal is not critical, since its effects diffuse throughout the aluminum.[69]

There are 2.2 x 10^{22} atomic nuclei per gram of aluminum, and each of these is the source of a reduction of about 9.2 x 10^{-20} ergs in gravitational energy. This is equivalent to a reduction of 2000 ergs per gram per cycle.

Since these cycles occur at the rate of about 10^4 per minute, we can expect about two joules per minute to be removed and stored in a cloud around the aluminum specimen. In these estimates, the rate of decay of orientation of the latter cloud, as well as the rate of orientation by the microwave field have been neglected. For the present these rates are unknown; the guiding rule for the experiment to be performed will be to select the experimental parameters so that at least ten percent of the weight of the specimen used is removed. For example, the rate of orientation is proportional to the square of the strength of the microwave field (i.e. amplitude of variation), and this is one of the parameters it is proposed to vary.

DESCRIPTION OF THE EXPERIMENTAL APPARATUS

This proposal is streamlined to deliver the maximum number of useful results with the minimum of investment.

In accord with this goal, the experiments will be performed at room temperature, although most of the dynamic nuclear orientation experiments have been performed at very low temperatures (tenths of a degree Kelvin above absolute zero). In addition, the generation of the microwave field is accomplished with the aid of a wave guide; both wave guide and electromagnet are in the possession of the proposed experimenters and no funds are being requested for their purchase. A schematic for the experiment is presented in *Figs. 1* and *2 [pp. 266, 267]*. The manner in which the apparatus is to be used has been discussed above.

PARTS LIST – EDITORIAL COMMENT

Ed note: **The reader assumes all risk for costs, liabilities, or damages of any kind**. *Please read the* DISCLAIMER *on pp. 1 – 3 before committing time or money to the program. While the results of the 1994 experiment (see Part VIII, pp. 283 – 330) were encouraging, there can be no guarantee that the reader will have the same results.*

The following list was provided in the original grant proposal. I have updated the prices by researching the cost of the same or equivalent equipment on eBay and other outlets.

The cost of the apparatus and the difficulty of assembling it are a barrier to repeating the 1994 experiment, but the height of the barrier depends on the qualifications and resources of the experimenter. The author strongly encourages the reader to enlist the aid of an electrical engineer who has theoretical and hands-on familiarity with microwave technology and understands electron paramagnetic resonance and dynamic nuclear orientation. If this requirement is met, the experimenters might be able to improve on the configuration suggested here and in the experimental report.

In 1994, dynamic nuclear orientation was achieved with the aid of an electron paramagnetic resonance (EPR) unit. An EPR unit is high-end equipment found only in university physics and chemistry labs. The price of an EPR unit puts it well beyond the reach of most amateur experimenters (quotes in the range of $250,000 were found). Having a "plug-and-play," professionally built EPR device eliminated a host of problems and delays that may arise in a homebuilt device.

In principle, however, dynamic nuclear orientation is not difficult to achieve. The parts list below allows construction of a unit that should theoretically yield the same results as an EPR machine. However, building the unit from scratch exposes the experimenter to problems that the EPR unit manufacturer eliminated in the course of research and development. These problems are probably not documented anywhere, which is why assembling and testing the device will require expert advice, preferably from an electrical engineer with experience in microwave technology. This cannot be emphasized enough.

The sample is placed in a waveguide and the waveguide is immersed in a powerful electromagnetic field. The electromagnetic field inside the waveguide must be strong enough to cause the electrons in the metallic sample to precess. The weight of the sample must also register on the scale in real time. Again, arranging these elements requires expert guidance from a good electrical engineer, as well as fine-tuned equipment.

If the equipment is faulty or it is arranged improperly, the experimenter will lose their investment and their "failure" report will not represent a valid test of the hypothesis.

The following list reflects minimum requirements for apparatus to conduct the proposed experiments, along with estimated costs. Low and high estimates are given based on price variability discovered while researching the list. The examples cited are not the only alternatives for each component.

REQUIRED COMPONENTS AND ESTIMATED COST

1) Lock-in amplifier: $1,000 – $5,500

A *lock-in amplifier* extracts a signal with a known carrier wave from an extremely noisy environment.
Examples with prices:

a) SRS Stanford Research Systems SR510 Lock-in Amplifier Unit Module (used), $1,000

b) EG&G 7260 DSP (Digital Signal Processing) Lock-in Amplifier (used), $3,000

c) Perkin-Elmer Instruments 7265 DSP Lock-in Amplifier (used), $5,500

2) Microwave isolators (two): $450 – $2,000

A *microwave isolator* is a two-port device that transmits microwave power in one direction only. It is used to shield equipment on its input side from the effects of conditions on its output side; for example, to prevent a microwave source being detuned by a mismatched load. Examples below:

a) Farion TWG103D2-1 (used), $225 each

b) High-Power Varian Isolator (used), $350 each

c) FBI-28-SSESO Millitech Isolator (used; new over $1,000), $480 each

d) M/A-Com, Inc., R365S 26.5 to 40Ghz HP Isolator (used; new over $1,000), $480 each

3) One-watt traveling-wave tube amplifier: $130 – $4,000

A *traveling-wave tube* is a specialized vacuum tube that is used to amplify radio frequency signals in the microwave range. The TWT belongs to a category of linear beam tubes, such as the Klystron, in which the radio wave is amplified by absorbing power from an electron beam as it passes down the tube. Expert advice is required before purchasing, as indicated by the wide range in prices.

a) HP 491C Traveling Wave Tube Amplifier (used), $130

b) Hughes 8010H/8010H09F000 TWT/TWTA Traveling Wave Tube Amplifier 10W GHz 12 GHz (used), $4,000

4) Function generator: approx. $120

A *function generator* is electronic equipment or software used to generate different types of electrical waveforms over a wide range of frequencies. One of the common forms generated is the square wave used in the experiment. Integrated circuits (ICs) may also be used to generate waveforms.

HP 3310A (used), $120

5) Oscilloscope: $150 – $270

An *oscilloscope* shows constantly varying signal voltages as a two-dimensional plot of one or more signals as a function of time. Oscilloscopes are used to observe the change of an electrical signal over time, with voltage and time describing a shape that is continuously graphed against a calibrated scale. The waveform can be analyzed for properties such as amplitude, frequency, rise time, time interval, distortion, and more. Digital oscilloscopes may calculate and display these properties directly, rather than manually measuring the waveform versus the scales depicted on the instrument screen.

An oscilloscope can be adjusted so that repetitive signals can be observed as a continuous shape on the screen. A *storage oscilloscope* allows single events to be captured by the instrument and displayed for a relatively long time, allowing observation of events too fast to be directly perceptible.

a) HP 1740A Dual-Trace 100MHz 2-Channel Oscilloscope (analog, used), $150

b) DSO5102P Hantek Digital Oscilloscope 100MHz 2-Channel 7" WVGA DHL (used), $270

6) Directional coupler: approx. $50

A *directional coupler* is a passive device used in radio technology. It couples a defined amount of electromagnetic power in a transmission line to a port, enabling the signal to be used in another circuit. A directional coupler only couples power flowing in one direction.

HP Agilent 774D (used), $50

7) Microwave crystal detector: $160 – $300

Used to rectify an RF signal.

HP Agilent 423B Crystal Detector (used), $160 – $300

8) Low-noise amplifier: $125 – $500

A low-noise amplifier amplifies a low power signal without amplifying the accompanying noise, improving the signal-to-noise ratio.

9) Electromagnet (3000+ Gauss): $100 – $3,000

The magnet must be as powerful as a magnet found in a low-end MRI device. Military surplus electromagnets vary in cost; eBay is also a possible supplier. The electromagnet requires a DC power supply (see below).

10) DC power supply: $100 – $900

Changes alternating current to direct current to power electromagnet.

HP 6264B (used), $100

11) Gauss meter: $1,200 – $2,300

Detects and measures magnetic fields.

a) Lakeshore Cryotronics Model 410-HCAT Handheld Gaussmeter, $1,207

b) Pacific Scientific 5180 Gaussmeter, $2,300

12) Metallic sample: $1,000

This is a job for a custom metal shop. Pure $A1_{27}$ (99.999%) is an absolute requirement. The sample is dusted with iron or chromium particles or inclusions as described in the experimental report (*see p. 294*). It is suggested that the sample should be heavier than the sample used in the experiment. The limit of the suggested scale is 100 grams. Again, a good electrical engineer may be able to devise a test chamber that can accommodate a much larger sample.

13) Weight scale: $250 – $2500

The scale requires software to track weight changes in real-time increments of milliseconds or, better, microseconds and feed the data to a computer. The software needs to match input from the microwave generator.

LW Measurements HRB103 (new), $250 (digital, 100 grams, .001 gram sensitivity; computer output available, but requires programming by technician not included)

14) Miscellaneous cabling: $500

15) Secure laboratory: $0 – $10,000

The price of a lab varies wildly, depending on whether or not the experimenter already has access. However, a secure laboratory is highly desirable, given the value of the equipment and the possible spying or theft of lab notebooks, data, and IP, as occurred at Kitty Hawk. *And the stakes here are much, much higher than Kitty Hawk*. If the experimenter is using a garage or a backyard workshop, it should have locks, alarms, motion detectors, and remotely accessible video monitors that feed recordings to the cloud. All files should be encrypted and backed up at a secure remote location.

16) Personnel: variable, from $0 – $70,000 each

The cost depends on whether the experimenter needs to hire an electrical engineer and someone to assemble equipment or not. The labor cost in 1994, as far as I know, was zero.

TOTAL ESTIMATED COST

Sum of low estimates: $5,335

Sum of high estimates: $102,940

[Ed note: This is the price of a do-it-yourself experiment in which the experimenter builds the dynamic nuclear orientation apparatus. The cost of the experiment varies widely, depending on the quality of equipment purchased, and access to facilities and expert advice. Ideally, the experimenter knows microwave technology and works in a laboratory with easy access to an EPR. Access to an EPR improves the chances of success and eliminates most of the parts list.

While the high and low estimates vary significantly, they do provide a ballpark figure that the experimenter can use as the starting point for a budget.]

SCHEDULE

Time to completion: Roughly six months

Purchase of equipment: Two months

Assembly of instrumentation: Two months

Experiments: Six weeks (includes time for correcting equipment errors and generating a final report)

If the experiments are successful, the project enters Phase 2: investor acquisition and research to determine engineering parameters for a propulsion system. [*See p. 187*.]

SUMMARY

This proposal requests funding for an experiment to test the predictions of the theory of Refs. 2, which, in 1960, advanced the assertion that, since a light signal (featured in Einstein's special theory of relativity) undergoes fluctuations in intensity, its apparent speed (as measured) may vary. This leads to a fundamental reformulation of the special theory of relativity and results in a unified field theory.[70]

If successful, this program will lead to extensive exploration and colonization of our planetary system and beyond, with considerably less cost than presently projected by space agencies using conventional rocket propulsion.

Fig. 1. Schematic of Experimental Apparatus [Ed note: Note similarities and differences in the 1994 experiment.]

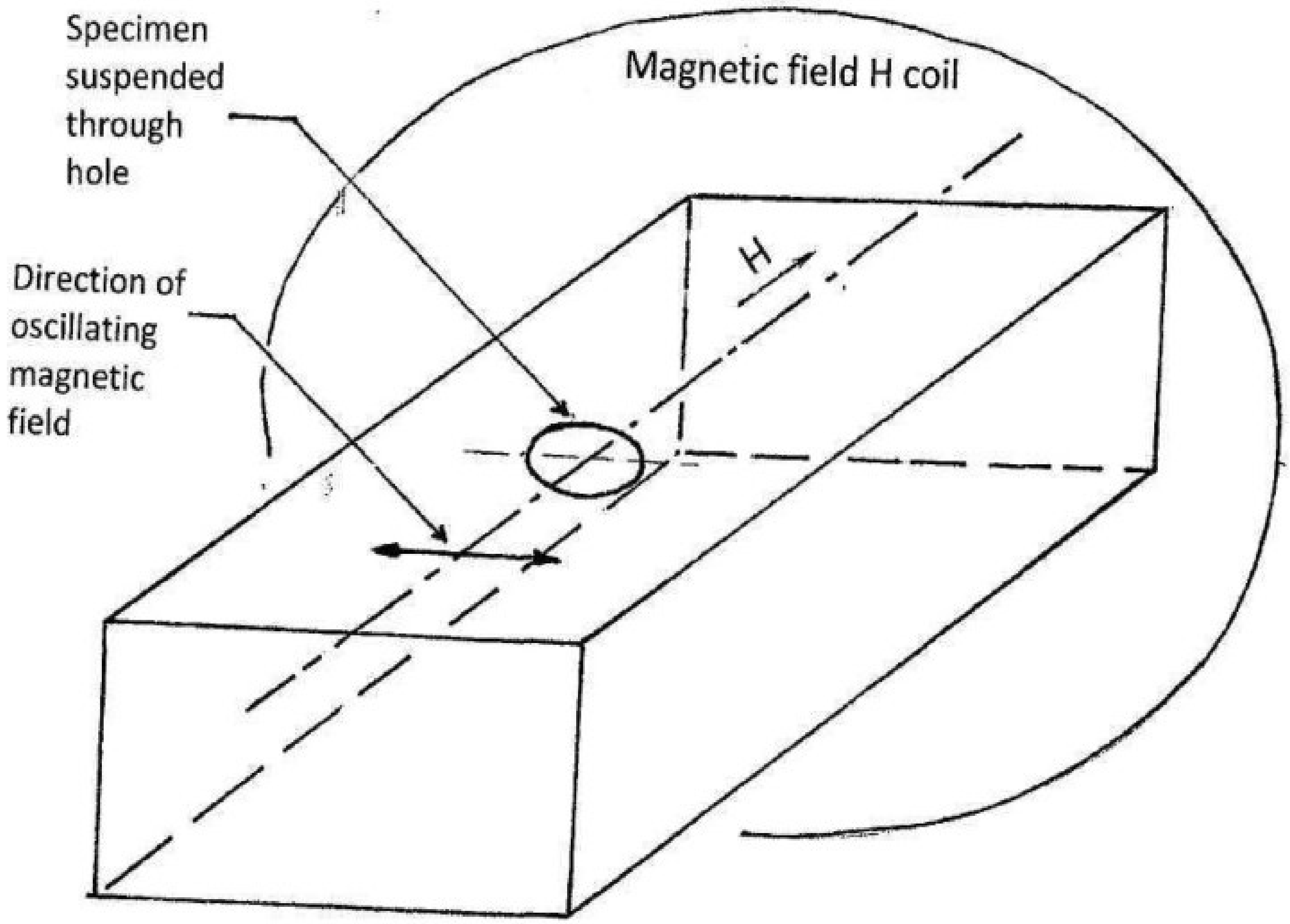
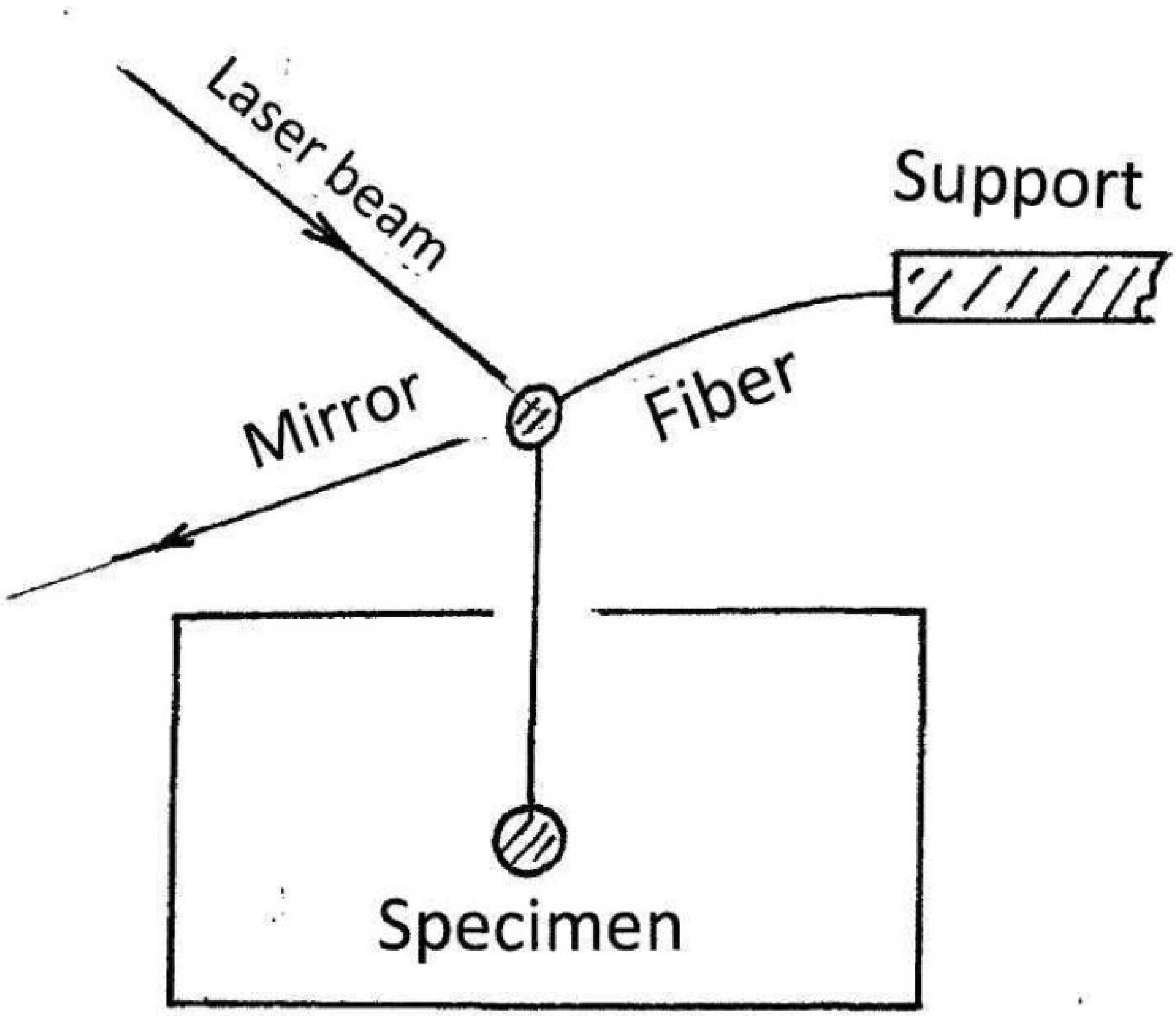


Fig. 2. End View of Experimental Apparatus [Ed note: Note similarities and differences in the 1994 experiment.]



REFERENCES

1) M. A. Garbell, “Soviet Research on Gravitation, An Analysis of Published Literature,” sponsored by Science and Technology Section, Air Information Division, AID Report 60-61, 379 pages. Distributed by U.S. Department of Commerce, Business and Defense Services Administration, Office of Technical Services, Washington, D.C., October 1960. [*Available online*.]

2) F. E. Alzofon, “The Origin of the Gravitational Field,” *Advances in the Astronautical Sciences*, Vol. 5, Plenum Press, N.Y. (1960), a publication of The American Astronautical Society.

3) F. E. Alzofon, “Anti-Gravity with Present Technology: Implementation and Theoretical Foundation,” AIAA/SAE/ASME 17th Joint Propulsion Conference, Colorado Springs, July 27-29, 1981, Paper Number AIAA-81-1608. [*Available online at AIAA website; see p. 348.]*

4) F. E. Alzofon, “The Unity of Nature and the Search for a Unified Field Theory,” *Physics Essays, 6*(1993) 599-608. *[Reprints available through Physics Essays.]*

5) F. E. Alzofon, “Light Signals, the Special Theory of Relativity and Reality,” *Physics Essays, 14* (2001) 144-148. *[Reprints available through Physics Essays.]*

6) C. D. Jeffries, *Dynamic Nuclear Orientation*, Interscience, John Wiley & Sons. N.Y. 1963

7) L. L. Foldy, “Elementary Particles and the Lamb-Retherford Line Shift,” Phys. Rev. *93* (1954) 880.

8) H. E. Puthoff, “Gravity as a Zero-Point Fluctuation Force,” Phys. Rev. A *39* (1989) 2333. *[Ed note: Dr. Puthoff and my father were colleagues at SRI in the late 1950s and remained in touch on a friendly basis through the 1990s or later. Their gravitation theories are similar in concept, but differ in significant respects*.]

9) G. E. Pake, “Fundamentals of Nuclear Magnetic Resonance Absorption,” I. Am. J. Physics, *18* (1950) 438, and II, Am. J. Physics, *18* (1950) 473.

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[55] *In March, 1989, University of Utah electrochemist Martin Fleischmann reported production of heat by nuclear processes at room temperature. The press called it “cold fusion. “By late 1989, cold fusion was discredited in the minds of most scientists, who lambasted Fleischmann’s methods. At the time my father wrote, the bad publicity was yet to occur. The uproar, however, indisputably demonstrated public interest in energy production.*

[56] *This section referenced on p. 32.*

[57] *Ref. 1, p. 268*

[58] *Ref. 2 and 3, p. 268*

[59] *Refs. 2, 3, 4, 5, p. 268*

[60] *A valuable supplement to the above can be found in Ref. 3, p. 268, from p. 1, col. 2, para. 1, "Although the above deductions...," through p. 2, col. 2, para. 2, which begins "We here depart from Einstein's geometrical formulation...." The lengthy excerpt was not included out of respect for the A1AA copyright.*

[61] *Ref. 1, p. 268*

[62] *Ref. 1, p. 268. Ed note: Private communication from M.A. Garbell to the writer (FA). Ref. 1 corroborates what FA wrote here, but less directly, by alluding to the possibility of altering the gravitational force using Alzofon's theory; Garbell says nothing of the kind about any other theory, including, of course, the GTR.*

[63] *Refs. 2, 3, 4, p. 268*

[64] *Ref. 6, p. 268*

[65] *Ref.6,p. 268*

[66] *Ref. 7, p. 268*

[67] *Ref. 3, 4, p. 268*

[68] *Ref. 9*

[69] *Ref. 6, p. 268*

[70] *See Refs 3, 4, 5, p. 268*

Chapter 36

“MICROCOSM CONDITIONS MACROCOSM”

INTRODUCTION (by the Editor)

My father mentioned this three-word phrase and its converse, “Macrocosm reflects microcosm,” in passing during one of our telephone conversations in the 1990s. It stuck with me because it had the quality of an aphorism by a Taoist philosopher, or more so, one of the Presocratics—Heraclitus, for example. When I searched, however, Google, which knows *everything*, came up empty. Yet those three words have the compact symmetry and depth of something that *somebody* must have said, if not in ancient Greece, then somewhere, sometime. Yet apparently no-one did. The phrase triggers a vision of the Big Bang: Out of the subatomic world sprang the galaxies. This was a frequent experience with my father: He noticed things that others did not, and when he pointed them out, I would invariably think, “Of course, that’s obvious.” But it *wasn’t* obvious, because while I had *seen* it, I had never really *noticed* it. Nor had anyone else. Something like this occurred at least once in every phone call. It was spooky, but after a while I began to look forward to it.

The Presocratics were not philosophers in the same sense as Plato. They did not refer to the gods for causation or to ideal forms for “ultimate reality.” They were not concerned with the *“oughts”:* “the good,” “the just,” “the ideal state.” *Cosmology* was their arena and they looked to nature, which they considered sacred, for answers. Presocratics, such as Pythagoras, used mathematics to describe nature. They were, in a sense, the earliest scientists. My father, too, considered nature sacred, and his final paper was on cosmology. It was written when he was ninety years old. The paper speaks for itself, so I will not spin out the introduction further. It was dedicated to Richard Feynman.

A “NEW AND SIMPLE IDEA”

Dark Matter-Energy and the Crisis in Physical Theory

ABSTRACT: *Correction of an omission in A. Einstein’s operational definitions of time and space intervals in the special theory of relativity leads to an improved phenomenological and conceptual foundation for a previously proposed unified field theory. In combination with Einstein’s researches on the fluctuation in energy of black body radiation, there results a “new and simple idea” of the kind Professor Richard Feynman felt to be necessary for the solution of the cosmological constant problem. A brief description of the formalism of the theory is presented. The infinite zero-point energy of the vacuum is eliminated. A model for the origin of inertial mass and dark matter-energy is deduced. The resulting relation between observed matter and dark matter-energy leads to a restriction on their magnitudes. The magnitudes of the latter quantities are then estimated from astronomical data. A model is proposed for the origin of the gravitational field in terms of a dynamic process at the basis of the proposed theory. The success of the special theory of relativity in predicting the results of three crucial observations establishing the validity of the general theory of relativity and the elimination of the infinite vacuum energy suggest that the unified field theory can lead to a solution of the cosmological constant problem.*

Key words: unified field, inertial mass, dark matter, gravity model, cosmological constant

Bracketed numbers are references to published sources (see p. 281).

1. INTRODUCTION

The late Professor Richard Feynman called for a "new and simple idea" [1] in connection with the cosmological constant problem [2]. The problem arises in the evaluation of a constant introduced into the equations of motion of the general theory of relativity (GTR) [3] and is related to the expansion of the universe [4].

Since the constant appears in a theory based on a model of the origin of the gravitation field, attempts at a solution of the problem necessarily involve phenomena on a cosmological scale. On the other hand, its relation to the expansion of the universe has brought into consideration the zero-point energy density of the vacuum [4], dark matter [2], and the nature of inertial mass [2], implicating subatomic phenomena.

Commenting on the connection between the latter topics, Professor Feynman pointed out that the zero-point energy in a vacuum would be expected to generate a gravitational field: instead "it is zero" [1]. As a consequence, Feynman suggested that the "new and simple idea" should also reformulate modern physics so that there is no zero-point energy in a vacuum [1]. Indeed, analysis of observations by the Hubble telescope has supported Professor Feynman's belief in the lack of any objective existence of zero-point vacuum energy [5, 6].

The need for a solution to the cosmological constant problem has been characterized as a "veritable crisis" in physical theory [7] whose solution may be expected to have a considerable effect on physics as well as astronomy.

This paper proposes a "new and simple idea," based on experiment, for the analysis of cosmological phenomena which meets Feynman's goal and is in accord with [5, 6]. The discussion emphasizes physical models, rather than a mathematical formalism, although an abbreviated mathematical basis for these models is provided. The theory has been discussed in more detail in several papers [8–10] for subatomic, atomic and terrestrial phenomena with a slightly different (but equivalent) basis, with the same formalism as presented below. It has been shown to lead to a unified field theory (UFT) of a matter-radiation field, reducing in the proper contexts to the Maxwell electromagnetic field, Newtonian and relativistic mechanics and quantum mechanics. A model for the origin of the gravitational field was also included. It was shown that the infinite zero-point vacuum energy can be eliminated, as well as other infinities which have long been characteristic of a zero separation of test body and classical field source.

2. POINT OF VIEW OF THE UNIFIED FIELD THEORY

The point of view in the formulation of the UFT is based on observation: a viewpoint diametrically opposed to the approach employed in Einstein's unified field theory [11]. In a general vein, Einstein states "...this axiomatic basis of theoretical physics cannot be extracted from experience but must be freely invented and can we ever hope to find the right way? ...I am convinced that we can discover by means of purely mathematical constructions and the laws connecting them with each other, which furnish the key to understanding of natural phenomena ... in a certain sense, therefore, I hold it true that pure thought can grasp reality, as the ancients dreamed" [12]. Further, Einstein's emphasis on mathematics and deduction as a source of inspiration for the creation of a new physical theory is summarized in his remark that "... the creative principle resides in mathematics" [12]. The latter point of view has permeated theories subsequent to the GTR, especially as they relate to a model for the gravitational force field. That is, the field is assumed to be identified with the curvature of the space-time metric—a geometrical property, rather than due to a physical dynamic process.

In contrast, we propose an alternative model for the origin of the gravitational force field resting on properties of subatomic phenomena, rather than on an intrinsic property of the space-time metric. This is expected to facilitate a unification of gravitation and the other three fundamental forces in nature—the electromagnetic, strong and weak forces. Further, the point of view adopted in the formulation of the UFT is in accord with a tenet advanced by H. Reichenbach, in his support of A. Einstein's original formulation of the special theory of relativity (STR) [13]. Based on a belief in logical positivism, it is asserted that, in advancing a physical theory, it is best to proceed by induction, in contrast to Einstein's dependence on deduction in [12].

H. Minkowski is more forceful in this regard: "My views of space and time have sprung from the soil of experimental physics and therein lies their strength." [14]

In addition, P. Bridgman states, in support of the STR [15], that every quantity introduced in a physical theory should have an operational definition, an opinion we shall implement below for the UFT. In this connection, we remark that such a requirement evidently can profoundly affect the interpretation of the data recorded, as, for example, the alteration of the length of a body when in motion relative to the observer.

Such an effect would not necessarily be observed were it not for the manner of measuring length as specified in the STR, i.e. by means of light signals [16].

The "simplicity" of the idea to be proposed lies in taking over the essential concepts and thought experiments of the STR. The "new" aspect of the idea refers to the alteration of the light signals used in the STR, in accord with the implications of [17] and [18]: that is, the fluctuations in intensity intrinsic to black body radiation are assumed to be a property of radiation propagated in a vacuum. The latter assumption is similar to that made by A. Einstein in [17] and [18] with respect to a quantum energy exchange property.

Moreover, to preserve logical and measurement consistency in the operational definition of a linear length in the STR, it is necessary to define coordinate magnitudes by means of light signals, i.e. for a zero, as well as nonzero relative velocities of coordinate systems.

In accord with [17 – 19], it is noted that the fluctuations in radiation intensity increase as the scale of measurements in space and time decreases.

The emphasis on the importance of radiation fluctuations is not only justified by [17 – 18], but also by researches in quantum mechanics, quantum electrodynamics and random electrodynamics [20]. It has also been shown that the formalism of nonrelativistic quantum mechanics is equivalent to classical mechanics on which is superimposed a random walk [21].

4. ALTERATION OF THE MINKOWSKI METRIC

As a consequence of the foregoing considerations, the average, observed, arrival time of a light signal t becomes $t - t_0$ where t_0 is a random variable such that $-\infty < t_0 < +\infty$ with a vanishing average value: $\langle t_0 \rangle = 0$. The nature of the statistical distributions to be used in this connection has been indicated elsewhere [8, 9].

Owing to the latter considerations, the equation descriptive of the propagation of a light signal along the x-axis of a rectangular Cartesian coordinate system becomes $x - x_0 = c(t - t_0)$ where x_0 varies over the same range as t_o and with vanishing average value and c denotes the speed of light in a vacuum. Similar relations hold for the y and z coordinates.

When the above alterations are applied to the Minkowski metric of space-time

$$s^2 = x^2 + y^2 + z^2 - c^2 t^2 \tag{1}$$

and averaged, we find (where $r^2 = x^2 + y^2 + z^2$, for example)

$$\langle S^2 \rangle = r^2 - c^2 t^2 + \langle (r_0)^2 \rangle - c^2 \langle (t_0)^2 \rangle \tag{2}$$

The latter calculation suggests replacing the metric (1) by

$$S^2 = r^2 - c^2 t^2 + (r_0)^2 - c^2 (t_0)^2 \tag{3}$$

Setting $S = 0$ yields an equation descriptive of the propagation of a spherical light signal, subject to a fluctuation motion. Further physical interpretation of the metric (3) will be provided in Section 5.

The metric (3) is spatially flat (i.e. Euclidean) in agreement with observation [22]. In addition, the metric (3) is invariant under the Lorentz transformation:

$$x' = \gamma(x - \beta ct)$$

$$y' = y$$

$$z' = z$$

$$ct' = \gamma\,(ct - \beta x) \tag{4}$$

$$(x_0)' = \gamma(x_0 - \beta ct_0)$$

$$(y_0)' = y_0$$

$$(z_0)' = z_0$$

$$(ct_0)' = \gamma(ct_0 - \beta x_0)$$

where $\beta = v/c$, $\gamma = 1/\sqrt{(1 - \beta^2)}$ and v is equal to the relative velocity of two observers moving parallel to the x-axis.

Evidently the transformation (4), applied to the differences $X = x - x_0$, $Y = y - y_0$, $Z = z - z_0$ and $cT = c(t - t_0)$, results again in the invariance of the metric

$$S^2 = X^2 + Y^2 + Z^2 - c^2T^2 \tag{5}$$

where X, Y, Z, and T are random variables such that $\langle X\rangle = x$, $\langle Y\rangle = y$, $\langle Z\rangle = z$ and $\langle T\rangle = t$. Subtracting the second set of four equations in (4) from the first set of four equations yields a Lorentz transformation for the quantities X, Y, Z, and T directly. Under the latter transformation the metric (5) is again invariant. In this case, however, X, Y, Z, and T contain “hidden” variables, and, together with the metric, can serve as part of a basis of a formalism for relativistic quantum mechanics. For the latter formalism, expectation values are calculated for a matter-energy (i.e. unified) field and not with the aid of a probability field which has no physical existence.

The differential form of the proposed metric (3) is

$$dS^2 = dr^2 - c^2dt^2 + (dr_0)^2 - c^2(dt_0)^2 \tag{6}$$

No quantization postulate has been introduced in the above discussion. This omission is supported by the derivation of the black body radiation energy spectrum without such a postulate; Lorentz invariance was, however, found to be essential [23].

5. MOMENTUM AND ENERGY OF THE UNIFIED FIELD

The following definitions have been chosen to parallel those of the STR [3]. In addition, it is found that the resulting formalism reduces to the STR in a suitable context.

Given some identifiable feature of the field described by the metric (6) at the point (x, y, z, t, x_0, y_0, z_0, t_0), we define momentum components along the coordinate axes by

$$\boldsymbol{p} = m(d\boldsymbol{r}/d\tau) \text{ and } \boldsymbol{p}_0 = m(d\boldsymbol{r}_0/d\tau) \tag{7}$$

where $\boldsymbol{r} = (x, y, z)$, $\boldsymbol{r}_0 = (x_0, y_0, z_0)$, $d\tau = +\sqrt{(dt^2 - dr^2/c^2)}$, and energies

$$E = mc^2(dt/d\tau) \text{ and } E_0 = mc^2(dt_0/d\tau) \tag{8}$$

and where m is a factor with the dimensions of mass, whose nature will be clarified below.

Inserting the condition that neighboring observers can communicate with one another, i.e. $dS = 0$, into equation (6) and dividing the resulting equation by $d\tau^2$, we find

$$p^2 + (p_0)^2 = (E/c)^2 + (E_0/c)^2 \tag{9}$$

If the average displacement dr of the given feature be set equal to zero, then $d\tau = dt$ and

$$E = mc^2 \tag{10}$$

and

$$(p_0)^2 - (E_0/c)^2 = (mc)^2 \tag{11}$$

In view of equations (10) and (11), we interpret m as the rest mass of the given feature of the UFT field, generated by the fluctuating motion of the field. This motion is proposed to be the origin of inertial mass. Averaging preserves the form of equation (11).

In the opposite extreme, we set $dr = cdt$, implying that $dr_0 = c\ dt_0$. This state of motion is readily interpreted as a light signal accompanied by fluctuations propagated with the speed of light c.

In view of the properties of the extreme conditions of motion, indicating a duality in the nature of the UFT field, we propose that matter be denoted as "condensed radiation" and radiation be denoted as "dispersed matter."

At intermediate average speeds, the given feature of the field can be expected to have both matter and radiation properties.

In view of the latter mass and radiation properties of the field introduced, we call it the "matter-radiation field." Its ability to incorporate many other fields in its formal structure [8–10] leads to its designation as a "unified" field.

It is noted that the concept of a spherical light signal of the STR has been replaced by a spherical signal which includes matter states as well as radiation states; that is, two events may be connected by matter as well as radiation properties. In contrast, the spherical light signal of the STR refers solely to radiation.

The model corresponding to the above considerations implies that all observed matter and radiation is accompanied by fluctuations in energy with matter and radiation properties.

There is evidently a close analogy between the latter model and the concept of vacuum energy. We therefore propose that the vacuum zero-point energy concept be replaced by the UFT model, which is Lorentz invariant and yields finite results; it is not an intrinsic property of space-time, in accord with observation [5, 6]. Moreover, the useful deductions sometimes held to be evidence for the objective existence of the zero-point vacuum energy (e.g. the Casimir Effect) can be preserved with the latter revision, since it is acknowledged that their explanation relies on energy fluctuations, rather than on the background energy [24].

6. DARK MATTER-ENERGY

With reference to the remarks of the preceding section, it follows that all matter observed by optical and radio telescopes has additional and unobserved inertial mass characterized by very high frequency motion. It can, however, be detected by its effect on the angular momentum of large amounts of observed matter and by its gravitational effects.

It is proposed that the additional random motion accompanying radiation and matter observed by optical and radio frequencies is responsible for the phenomena associated with dark matter.

[*Ed note: The previous two paragraphs appeared in a draft version of the paper, but not in the* *final. They were restored here because it seemed possible that they were omitted by mistake. A handwritten note, “Check discovery of dark matter, “appeared in the margin. That check may have led to their being deleted*.]

Since the averaged, observed, motion of matter and energy, characterized by the four-vector ($\boldsymbol{p}$, E/c), is accompanied by a fluctuating motion described by the four-vector ($\boldsymbol{p}_0$, E_0/c), giving rise to inertial mass-energy (see eq. 11), we propose that dark matter and energy are root-mean-square consequences of the latter motion of the unified field.

In this connection, Professor Steven Weinberg has called for an explanation of why dark energy (here $\sqrt{[<(E_0)^2>]}$ is the same order of magnitude as energy in observed matter, i.e. $E = mc^2$ [25], implying that each acts as a constraint on the other.

The latter approximate equality becomes plausible in view of equations (10) and (11) and the proposed origin of dark matter-energy. Since Professor Weinberg specifies more closely that $\sqrt{<(E_0)^2>}$ is of the order *of* $2mc^2$, we deduce from (11) that $\sqrt{<(p_0)^2>}$ is approximately equal to $(\sqrt{5})(\sqrt{[<(E_0)^2>]}/c)$. this relation is to be compared with the condition for observing radiation alone for which the factor $\sqrt{5}$ (approximately 2.24) is replaced by unity. These relations, then, may be an aid in formulating an explanation for the observed magnitudes of dark energy and matter and illustrate the usefulness of the “new and simple idea.”

7. A MODEL FOR THE ORIGIN OF THE GRAVITATIONAL FIELD

The following discussion proposes a mechanism for the origin of the gravitational field based on the UFT’s inertial mass model and the principle of Le Châtelier [26], which states, essentially, that if a small perturbation be applied to a system in equilibrium, its parameters change in such a way as to restore equilibrium. It offers the possibility of removing the specialized role of the gravitational force in the GTR (i.e. a geometrical model, identified with the curvature of space-time), while the other forces in nature are held to be due to physical processes. The latter disparity hinders a unified representation of all these fields.

The Newtonian gravitation field exists in the presence of matter and not otherwise. It has been observed that all matter is composed of subatomic particles and therefore gravitation is a property common to and originating in these. Consistent with equations (10) and (11), we view these particles as bound states of the matter-radiation field with an internal motion described by equation (11), and with most of its mass m confined to a spherical region with diameter *h/mc*, where *h* denotes Planck’s constant. It is assumed that these particles are stable during the period of observation in accord with a similar assumption about the macroscopic state of matter in Newton’s law of gravitation. In effect, then, one is dealing with a physical system with internal fluctuations in energy analogous to a gas at a uniform temperature, composed of randomly moving molecules.

These concepts are the basis of the following approximate analysis.

Consider first a single mass particle-field of mass *m*. When a second particle-field is brought into the neighborhood of the first, the inertial mass of the first field increases to $m + \triangle m$ (we assume that $\triangle m/m$ is very small compared with unity) so that, by Le Châtelier's principle, the new equilibrium diameter of the field becomes essentially $h/(m + \triangle m)c$, or approximately $(h/mc)(1 - \triangle m/m)$ and mass energy (including that from the second particle-field) will tend to flow toward the center of the first particle-field.

Assuming that each particle-field retains its identity, there will be generated a force tending to move the second particle towards the first. A similar argument applies to the second particle-field so that there is a mutually attractive force urging the two particles together.

The equations of motion of the UFT for a point source of a static field (i.e. assuming a Newtonian type of field) requires that the field potential be proportional to $1/r$, where r represents the distance between source and test body.

We are then led to the plausible assumption that the force exerted by a subatomic particle on another subatomic particle by reason of its internal random motion, and at a distance greater than a Compton wavelength, can be identified with the Newtonian law of gravitation.

8. THE COSMOLOGICAL CONSTANT PROBLEM

The severity of the cosmological constant problem becomes apparent upon comparison of estimates of the constant from cosmology, limiting its absolute value to less than $10E^{-56}\ cm^{-2}$, while estimates based on zero-point energy (i.e. modern particle physics) differ from this limit by forty orders of magnitude [27]. Further evidence of the deep division between the two theories lies in Professor Feynman's remark that zero-point energy has no gravitational effect (and therefore no point of contact with the GTR), while the GTR has little to say about modern particle physics. At minimum, then, it would appear that a unifying physical model which leads to a finite replacement for zero-point vacuum energy, as well as a model for the origin of the gravitational field, would be a promising candidate for resolving the cosmological constant problem. A further complication to be resolved is that particle theory is often discussed in terms of the STR with an implicit assumption that all coordinate reference frames are in uniform relative motion, while the GTR deals with accelerated frames of reference.

To be sure, for sufficiently small regions of space-time, the GTR can be approximated by the STR [28]. Moreover, it has been shown that calculations establishing the validity of the GTR for three crucial observations can be replaced by estimates based on the STR.

These are: [29], for the red shift in radiation emitted by atoms in a strong gravitational field and the deflection of a light ray passing the sun, as well as [30], for the magnitude of precession of the perihelion of Mercury's orbit.

As a consequence, it would appear that if the UFT be added to the capabilities of the STR, with a consequent unification of particle and gravitational field theory, there could result an improved estimate of the cosmological constant, consistent with both theories.

9. SUMMARY

The preceding discussion has had two principal objectives:

The first objective was to show that, since the special theory of relativity is based on operational definitions using clocks and realistic light signals, the definition of space-time coordinate intervals must include the effect of light signal energy fluctuations on their magnitudes. This requirement is a *necessity* for the logical consistency of any resulting theory and leads in a natural way to a unified field theory which contains previously derived theories and their useful consequences.

The second objective was to show how the referenced unified field theory, when applied to cosmology, can serve as the “new and simple idea” felt to the necessary by Professor Richard Feynman for solution of the cosmological constant problem. As demonstrated above, the theory meets Feynman’s principal requirement that the infinite energy density of the vacuum be eliminated. From the expressions derived, it is then shown that there follows an explanation for the origin of dark matter and why it is of the same order of magnitude in energy as observed matter: an answer to a question posed by Professor Steven Weinberg.

Since the unified field theory lacks the infinities associated with the special theory of relativity, it is expected that it can aid in solution of the cosmological constant problem, especially since the fluctuations in matter-energy can be linked to observation through equation (11).

REFERENCES

1. P. Davis and J. Brown, *Superstrings, A Theory of Everything* (Cambridge University Press, New York, 1988)

2. A.H. Guth, *The Inflationary Universe* (Addison-Wesley, New York, 1942)

3. P.G. Bergman, *An Introduction to the Theory of Relativity* (Prentice-Hall, Inc., New York, 1948)

4. M. Roos, *Introduction to Cosmology*, 2nd Ed. (John Wiley & Sons, New York, 1997)

5. R. Ragazzoni, M. Turato and W. Gaessler, *Astrophys. J*. 587, L1 (2003)

6. R.R. Britt, http://www.space.com/scienceastronomy/quantum_hits_030402.htm

7. S. Weinberg, *Rev. Mod. Phys*. 61, 1 (1989)

8. F. Alzofon in AIAA/SAE/ASME 17th Joint Propulsion Conference, 1981, Colorado Springs, AIAA-81-1608

9. F. Alzofon, *Physics Essays* 6, 599 (1993)

10. F. Alzofon, *Physics Essays* 14, 144 (2001)

11. A. Einstein, *The Meaning of Relativity*, 3rd Ed. (Princeton University Press, Princeton, N.J., 1950)

12. A. Einstein, in *Essays in Science* (The Wisdom Library, The Philosophical Library, New York, 1934)

13. H. Reichenbach, in *Albert Einstein, Philosopher Scientist*, Ed. P. Schilpp, (Open Court, La Salle, IL, 1970)

14. H. Minkowski, in *The Principle of Relativity* (Dover, New York, 1952)

15. P.W. Bridgman, in *Albert Einstein, Philosopher Scientist*, Ed. P. Schilpp (Open Court, 1969)

16. A. Einstein, in *The Principle of Relativity* (Dover, New York, 1952)

17. A. Einstein, *Phys. Zeits*. 10, 185 (1909)

18. A. Einstein, *Phys. Zeits*. 10. 817 (1909)

19. L.D. Landau and E.M. Lifschitz, *Statistical Physics*, 3rd Ed., Part 1, Course of Theoretical Physics, Vol. 5 (Pergamon Press, New York, 1982)

20. T.H. Boyer, *Phys. Rev*. 11, 790 (1975)

21. E. Nelson, *Phys. Rev*. 150, 1079 (1969)

22. P. de Bernardis, P.A.R. Ade, et al. *Nature* 404, 955 (2000)

23. T.H. Boyer, *Phys. Rev*. 150, 1374 (1969)

24. T. Padhmanabhan, *Class. Quant. Grav*. 22, LI07 (2005)

25. S. Weinberg, http://supernova.lbl.gov/cylinder/weinberg.ps

26. *McGraw-Hill Dictionary of Physics and Mathematics*, Ed. D.N. Lapedes (McGraw-Hill Book Co., New York, 1978)

27. S.E. Rugh and H. Zinkernagel, in *History and Philosophy of Science*, Part B, 33, 663 (2002).

28. W. Pauli, *Theory of* Relativity (Pergamon Press, New York, 1958)

29. L.I. Schiff, *Am. J. Phys*. 28, 340 (1960)

30. R.J. Buenker, *Apeiron* 15, 509 (2008)

PACS (Physics and Astronomy Classification Scheme), Nos. 03.65Pm, 03.65Ta, 03.65Ud, 11.10Kk, 98.80Jk

PART VIII

The 1994 Experiment

It is a capital mistake to theorize before you have all the evidence. It biases the judgment.

— Sherlock Holmes

Chapter 37

INTRODUCTION

by David Alzofon

THE RATIONALE FOR THE EXPERIMENT and the circumstances surrounding it have been detailed elsewhere *(see Chapter 20, p. 119)*. Here we will discuss *weaknesses* in the setup, not as a confession, but rather to explain why my father regarded the results as unpublishable. My father, who had considerable experience with setting up and running experiments, did not believe any of the problems about to be discussed undermined the conclusion that the gravity control effect had been observed. It is hoped that pointing out these blemishes will enable the next experimental team to improve on the original design and generate a publishable paper.

First a few words about goals. It was never his intention to mount a foolproof, perfect experiment. The funding simply wasn't available to buy equipment that would allow that. Rather, he wanted to see if the gravitational effect would manifest at room temperature with the chosen materials. Since all textbook experiments on dynamic nuclear orientation had been conducted at temperatures close to absolute zero, this was something new. One of his predictions was that it would be possible to sustain nuclear orientation at room temperature using aluminum. If it worked, it would be especially fortunate for spacecraft construction, because aluminum is strong, cheap, and abundant.

As he described the experiment to me, he was seeking a qualitative, not a quantitative verification of the hypothesis. In particular, he predicted that the sample weight would spike during the "driving phase" of nuclear orientation when the microwave field was on, then drop as soon as the microwave field was turned off. Each microwave pulse would cause more orientation to accumulate in the sample, hence more weight to be lost each time the pulse was turned off, somewhat in the manner that pushing a swing increases the arc. This pattern was in fact observed, as can be seen in chart AF2001 (on the cover and below), and elsewhere.

Absence of the spikes from the pattern observed in the first trial (Plot AF0001, *p. 298*) is probably why he wrote: "No correlation between weight alteration and microwave field alteration was observed." I suspect what he meant to say was that weight loss *was* observed, but the spikes were not, so it was impossible to correlate the microwave pulses with the weight loss. As I look at Plot AF0001, it appears to me that there *are* two spikes, but the second spike is small enough to be equivocal. I must defer to FA's judgment and provide an accurate transcription of the results as he saw them.

One of the difficulties I had in interpreting the charts was in determining the meaning of the numbers on the vertical axes. As he put it in the introduction *(p. 296):*

> *The grams per volt factor is calculated from the nominal gauge factor of the strain gauge used in the weight alteration measurement (0.001V per gram), and the amplification gain. For example, if the amplification gain is 3000, this factor is calculated to be 1/0.001 x 3000 = 0.333333 grams per volt.*
>
> *Assuming the preceding factors are essentially correct, we obtain a total conversion factor 9.53764E-7 x 0.333333 = 3.17891E-7 gm weight per total counts. The latter value was then multiplied by the total number of counts to obtain incremental weight changes.*

While this explanation might have been helpful to someone who was already familiar with its meaning or well-versed in the interpretation of data from a scale setup like the one in the experiment, it was opaque to me. I showed the explanatory text and Plot AF0002 to three sophisticated readers, one of them an electronics genius and computer science instructor at a college in northern California, and none of them could figure it out completely. The college instructor (Master's degree and PhD candidate in mathematics at Stanford) wrote back the following:

> *For the vertical on the chart* [AF0002, p. 299], *I think that "- E - 4" means "times 10 with an exponent of-4", or, in other words, "times .0001". "- E - 5" would mean "times .00001".*
>
> *Therefore the numbers are (bottom to top)*
>
> *-1.4 x.0001 [or-.00014],*
>
> *-1.2 x. 0001 [or-.00012],*
>
> *-1.0 x.0001 [or-.00010],*
>
> *-8.0 x. 00001 [or -, 00008] etc.*
>
> *The number at the top, 7.3 x. 000000000001, doesn't appear to be in sequence with the others. I don't know anything about the physics, and I have no idea what a "volt/gram" could mean.*

More about the meaning of the vertical axis, I can't say, except that I suspect that the markings on the axis all show the same increments of weight, but that the data associated with each increment changes according to readouts from the computer. Admittedly, this is a guess.

It was disappointing to discover that the sample weighed only 1.1143 grams. The Mettler scale, however, was very sensitive and designed to show weight changes on the order of 0.01 *mg*. In other words, a very small change in weight would register large on the equipment. Suggested improvement: a much heavier (more expensive) sample, which would require a larger test cavity.

Another difficulty was the impossibility of precisely correlating the microwave pulses with the weight changes. An improved version of the experiment would attach data from the microwave field generator to the same clock as data from the scale. The experiments do show peaks and valleys in the right places on the timeline. What can't be told for certain is the correlation between the peaks and the square-wave pulses. My father remarked on this after I signed the NDA. The correlation would undoubtedly provide useful data. Without it, the results are unpublishable.

Because of a problem with the computer system (*see p. 297)*, the tests were limited to two microwave pulses. This problem could easily be eliminated with better equipment.

Could the weight alteration be caused by anything other than the configuration of fields? The material of the sample was paramagnetic, so magnetic fields alone would not affect it. The point is moot anyway, because the magnetic field surrounding the test cavity originated in the EPR and was constant, with no reversal in polarity. Constancy in the field was an absolute requirement for the experiment. Microwaves alone would have no effect on weight, either.

One physicist said, "How do I know this isn't just floor vibration?" when he saw the charts. Floor vibration *is*, in fact, visible on the charts in the ultra-fine-toothed shimmying along the length of each line, such as can be seen in chart AF0001 *(p. 298)*. The test chamber was isolated and vibration in the floor or the equipment did not register appreciably on the scale, so vibration is not a plausible explanation for a *weight* change. This did not impress the physicist, however, who seemed anxious to dismiss the results. This kind of reaction is part of the reason nothing was submitted to a journal. Standard controls, such as running the test with the microwave field but without the constant magnetic field and vice versa, were conducted. In each case the weight alteration vanished.

Some readers may be disappointed that there are no pictures of an object floating. After all, isn't that the point? YouTube is replete with demonstrations of "antigravity devices" making things float, so what's so great about removing 80% of the weight from a one-gram chunk of aluminum? Such desires are understandable, but more appropriate to a movie script. The goal of the experiment was to prove that the gravity control effect occurs at room temperature in the pattern and the amount *predicted by theory*. In order to observe weight changes, it was necessary to attach the metallic sample to a scale and obtain continuous readouts in real time.

Weight changes *did* occur with the predicted pattern, which has enormous implications. It means Phase I of the three-phase program—proof of concept—was complete. Phase II would begin by doing more tests, gathering more experimental data, and determining how to transfer the effect to the hull of a craft in the most efficient manner. Next, a drone saucer would be built and test flown. Data gathered from the drone test flights would be used to launch Phase III, construction of a manned space vehicle and any number of terrestrial flying machines, such as the one described in *Chapter 14 (p. 75)*. Making a metal ball bounce around in an "antigravity chamber" might have been possible, but it would have provided little more than a "feel good moment," and nothing in the way of useful data. The carefully timed and measured perturbations in the weight of a one-gram sample were far more significant.

One might even say they were earthshaking.

Chapter 38

GRAVITY CONTROL – PRELIMINARY EXPERIMENTS

By Dr. Frederick Alzofon

Dates of Experiments: May 26, June 17, and June 18, 1994

INTRODUCTION

The following report is an account of preliminary experiments designed to establish the feasibility of weight alteration by control of the orientation of atomic nuclei.

The theoretical justification of the process used in these "proof-of-concept" experiments has been described in two papers: "The Unity of Nature and the Search for a Unified Field Theory," by Dr. F. Alzofon (*Physics Essays*, Volume 6, pp. 599-608, 1994), and "Antigravity with Present Technology – Implementation and Theoretical Foundation" (proceedings of 17th Joint Propulsion Conference, Colorado Springs, CO, 1981, AIAA document reference no. AIAA-81-1608).

Briefly characterized, the theory predicts a correlation between rapid alterations in the orientation and the randomization of atomic nuclei with a net magnetic moment, and the weight of the specimen containing the nuclei. The theory also predicts a pattern in the weight alteration response (*see p. 290 below)*.

The experiments described in this report were designed to demonstrate this correlation and the feasibility of generating the predicted effect. The experiments were completely successful in this goal. Owing to the limited nature of the correlations sought, it was not necessary to perform highly accurate measurements.

Selection of the atoms whose nuclei were to be oriented was determined by the desire to maximize the effect desired. For this reason, metallic aluminum was chosen, as the nuclei of aluminum have a large magnetic moment.

The orientation of the aluminum nuclei was accomplished by means of dynamic nuclear orientation, although other means of orientation exist. Dynamic nuclear orientation is a well-known process that leverages the precisely timed flipping of large numbers of electrons to orient atomic nuclei. It is primarily used for assaying organic molecules. Devices manufactured by JEOL sell for roughly a quarter of a million dollars, but the experiment demonstrated that the effect can be achieved much more cheaply. (Dynamic nuclear orientation is not to be confused with nuclear magnetic resonance; they are two distinct processes.)

The following is a step-by-step breakdown of the method used to achieve dynamic nuclear orientation in the experiment:

1) A specimen of metallic aluminum was placed in a constant magnetic field (about 3300 gauss) at room temperature. The magnetic field causes the electrons in the metal to precess at the Larmor frequency (about 9.5 GHz).

2) A pulsed microwave field was then applied to the specimen. The field has the same frequency as the Larmor frequency of the metal electrons and has a magnetic field vector oriented at right angles to the constant magnetic field. The crossed fields cause the electrons to precess so violently that they tip over *en masse*. Their close proximity to the atomic nuclei causes the nuclei to also tip over and become oriented. The nuclear orientation can be thought of as a consequence of the preservation of angular momentum.

During the process of nuclear orientation we expected the weight of the specimen to change. The theory predicted a slight, transitory weight increase. In addition, when the microwave field is cut off, we expected the weight of the specimen to alter during the randomization of the nuclear magnetic moments. The theory predicted the weight would fall during this part of the cycle. Repeated cycling of the orientation and relaxation of nuclei would act like a pump, causing the weight loss to accumulate dramatically and eventually cascade toward complete weightlessness.

The rate at which the microwave field is pulsed depends on the relaxation time for oriented nuclei. At room temperature this is 6 ms; accordingly, 6 ms was the pulse duration chosen for most of the experiments. However, to demonstrate the critical character of this time interval, a different interval was chosen for some of the experimental trials. In the latter case, the desired correlation was not observed.

In summary, the predicted correlations between microwave field variations and weight variations were conclusively demonstrated, verifying the validity of the theoretical foundation for the experimental design, and at the same time establishing the viability of gravity-control technology for vehicle propulsion.

Chapter 39

EXPERIMENT 1, SETUP

May 26, 1994

INTRODUCTION

The tests conducted in Experiment 1 were of a preliminary nature; they functioned as a "get-a-hands-on-feel" for use of the equipment. The tests were conducted on May 26, 1994, beginning at 0930. Personnel present were Dr. Frederick Alzofon, *[name withheld by F.A.]*, and the owner operator of the equipment, *[name withheld by F.A.]*.[71]

Eight tests were conducted. The computer-generated data from these appears on charts AF0001 through AF0008 *(pp. 298 – 305)*. An additional test was run on a sample of pure aluminum without iron inclusions, and the weight alteration effect was observed here as well.

The equipment used consisted of an electromagnet producing a constant (dc) magnetic field, and an x-band microwave system and interfacing systems. The specimen whose weight was measured was placed within a resonant cavity in the dc magnetic field; the microwave field generated within the cavity was pulsed to produce the observed weight variation of the sample, measured by a sensitive transducer.

The sample on which measurements were made was composed of an aluminum-iron (Al-Fe) alloy with 97.5% Al by weight (99.999% pure) and 2.5% Fe by weight (99.99% pure). The alloy was powdered; the powder-particles' sizes were less than one micron.

The metallic powder, weighing 0.5047+/-.01mg gm, was mixed with a casting plastic and formed into a cylindrical shape having a diameter of 0.204+/-.001 inch and a length of 0.752+/-.001 inch. The total weight of the resultant sample was 1.1 143+/-.01mg gm.

Since the manufacturer of the plastic had no technical data about any effects the plastic might experience or cause in an excited microwave cavity, we performed tests to determine what such effects might be. No effects were observed to be caused by the plastic and no physical alteration in the plastic was observed.

MECHANICAL ADAPTOR APPARATUS

A plastic housing containing the sample and fitting into the microwave resonant cavity was constructed from a microwave plastic called Kel-F, manufactured by the 3M Company. An aluminum adaptor cylinder to which the Kel-F housing is fastened connects the housing to the microwave resonant cavity. The test sample is connected to the weighing transducer mounted on the aluminum cylinder by means of a small-diameter Kel-F rod weighing 0.1162 gm. (*See Figs. 2 – 12, pp. 319 - 329.)*

MICROWAVE SYSTEM CALIBRATION

A block diagram for the microwave system is presented in *Fig. 1*, p. 318.

The microwave system was calibrated by a former owner who had over eight years of experience building, debugging and calibrating equipment. The procedure for calibration is complex and may be available in a manual which is, at present, not locatable. The following simplified calibration procedure was used for the present experiment:

a) The empty resonant cavity's *(Figs. 2, 9, 10, 11)* resonant frequency was measured to be 9.550 GHz.

b) The Kel-F microwave plastic housing was inserted into the resonant cavity and a resonant frequency of 9.545 GHz was observed, a reduction of 0.005 GHz from the empty cavity value.

c) The casting plastic was inserted into the cavity and a resonant frequency of 9.530 GHz was observed, somewhat more of a reduction than in b) above for the Kel-F plastic, but still small enough to be considered negligible.

d) The Al-Fe cylindrical sample was inserted into the cavity and a resonant frequency of 9.235 GHz was observed, a difference from the unperturbed value of about 3.3 percent. This difference was also considered negligible.

The RF power input to the cavity was measured to have the value of 0.125 +/-0.005 watts with a Q of 1541 +/- 10.

The dc magnetic field of the electron paramagnetic resonance unit was measured to be 3008 +/- 5 gauss.

With reference to the timelines exhibited in the plots for experiments AF0001 through AF0008, and experiments AF2001 through AF2006, respectively, there appears to be a leading 5 – 6 ms off-time for the microwave field, beginning from time t = 0, for the first set of experiments.

In contrast, for the second set of experiments, there is no off-time. In general, the data for the set of experiments AF2001 through AF2006 appears to be much clearer and more accurate than the data for experiments AF0001 through AF0008.

SCALE

The weighing scale used to weigh the test samples was a Mettler high-accuracy scale capable of 0.01 mg weight-change resolution.

DATA SET DERIVATION

Each of the data sets consists of 1025 *x*-*y* pairs; the *x*-value represents a value of the time interval, and the *y*-value represents weight-base data after processing as described below.

The *x* data is sampled at 50 microsecond intervals, and since there are 1024 *x*-values, the total length of the time interval is 50 x 1024 = 51.2 milliseconds (ms). A “scan” is defined as the collection of 1024 data points, sampled at equal time intervals (50 microseconds), totaling a time interval of 51.2 ms.

Corresponding to each value of *x* (a “time bin”) there is stored a value of weight data which has been averaged over the number of scans. The data is stored as a six-bit word chosen from a possible 64 discrete levels for each scan; after *n* scans, 64*n* values of the weight data have been averaged.

The following notation with respect to the BioMation computer is used: “1024 scans/BS = 32” means that 32 groups of 1024 *x*-*y* pairs were averaged.

SCALING CALCULATIONS

The data acquisition equipment used for the experiments provided data in the form of dimensionless numbers or counts in a range between zero and a positive integer determined by the number of scans and input range setting. The number of counts is converted to increments of weight gain or loss by multiplication of two factors: volts per total counts and grams weight per volt.

The factor with dimensions of volts per total counts is calculated by the product: input range (0.5 V for all the experiments) in volts, divided by the number of scans and by the number of digitization levels (64). For example if 8192 scans were averaged, the conversion factor would be 0.5 / 64 x 8192 = 9.5367E-7 volts/total counts.

The grams per volt factor is calculated from the nominal gauge factor of the strain gauge used in the weight alteration measurement (0.001V per gram), and the amplification gain. For example, if the amplification gain is 3000, this factor is calculated to be 1/0.001 x 3000 = 0.333333 grams per volt.

Assuming the preceding factors are essentially correct, we obtain a total conversion factor 9.53764E-7 x 0.333333 = 3.17891E-7 gm weight per total counts. The latter value was then multiplied by the total number of counts to obtain incremental weight changes.

Note: The values of gauge factor, amplifier gain, and analog-to-digital conversion accuracy were not known to the accuracy desired and were only estimated.

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[71] *The photocopies of the report given to me by my father had only blank spaces where the names had been. Evidently he wanted to protect the identities of the other participants. I never learned their names.*

Chapter 40

EXPERIMENT 1, TESTS AND RESULTS

May 26, 1994

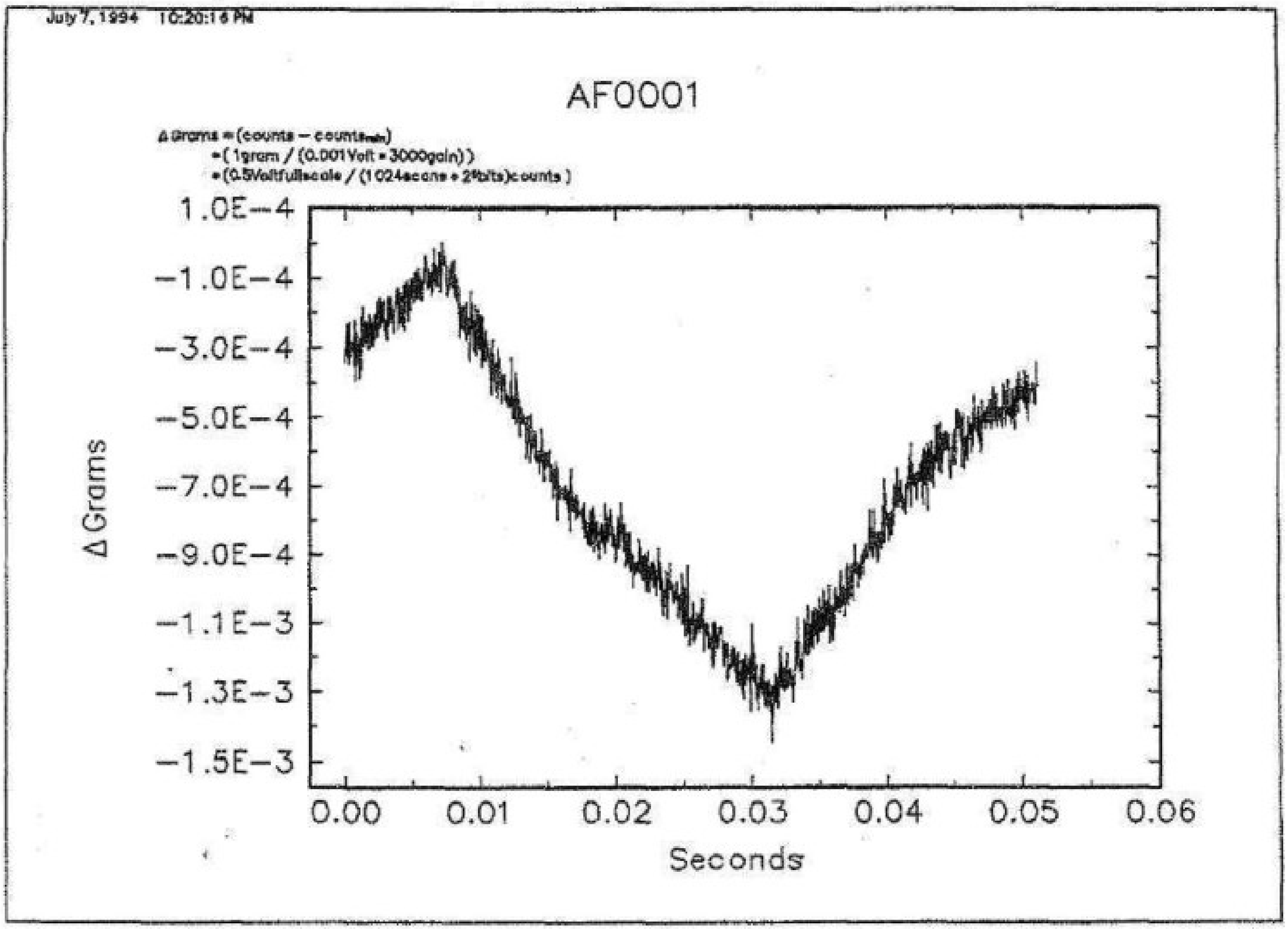
OVERVIEW

Nine tests were conducted. After several tests of multiple-period microwave input pulses, it was found that the microwave test equipment computer system would lock-up on tests comprising more than two periods; it was therefore decided to limit the test to two pulses, as sketched below. In accord with a suggestion by F. Alzofon, the on-off time intervals for the pulses were selected to be .008 seconds each. It was thought, for reasons which do not appear clear at this time, that the lifetime for polarized aluminum nuclei to relax at room temperature might be longer than the .006 sec reported in the literature.[72]

EXP. 1, TEST 1 - PLOT AF0001

Result: No correlation between weight alteration and microwave field alteration was observed *[see comment, p. 286]*. In processing the data, 32 scans of 1024-point data sets were averaged *[see p. 295]*.

TEST 1 – DATA



Ed notes:

Parts of the legend above the chart are illegible. As best as can be determined, they read as follows:

△ *Grams = counts – counts$_{min}$*

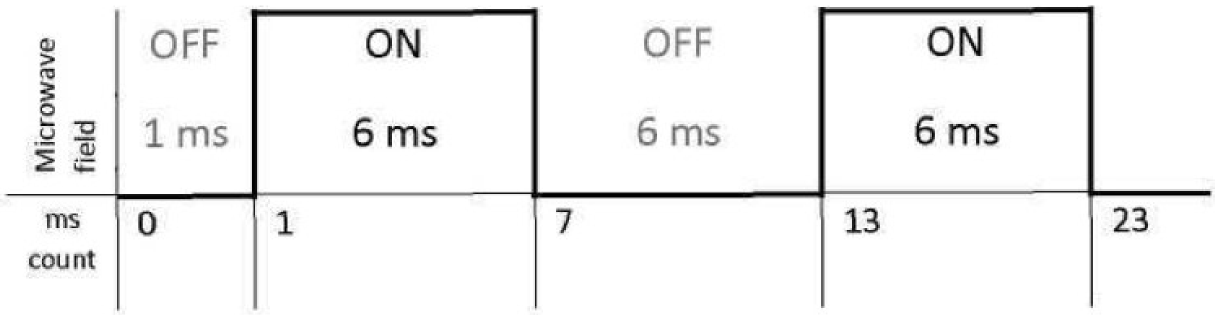
= 1 gram / (0.001 volt – 3000gain)

= 0.5 voltfullscale/(1024scans – 2 bits) counts. [The superscript between “2” and “bits” is illegible.]

See pp. 286, 295 for more. Note: All plots have the same date stamp (July 7, 1994). Apparently the setting was not adjusted.

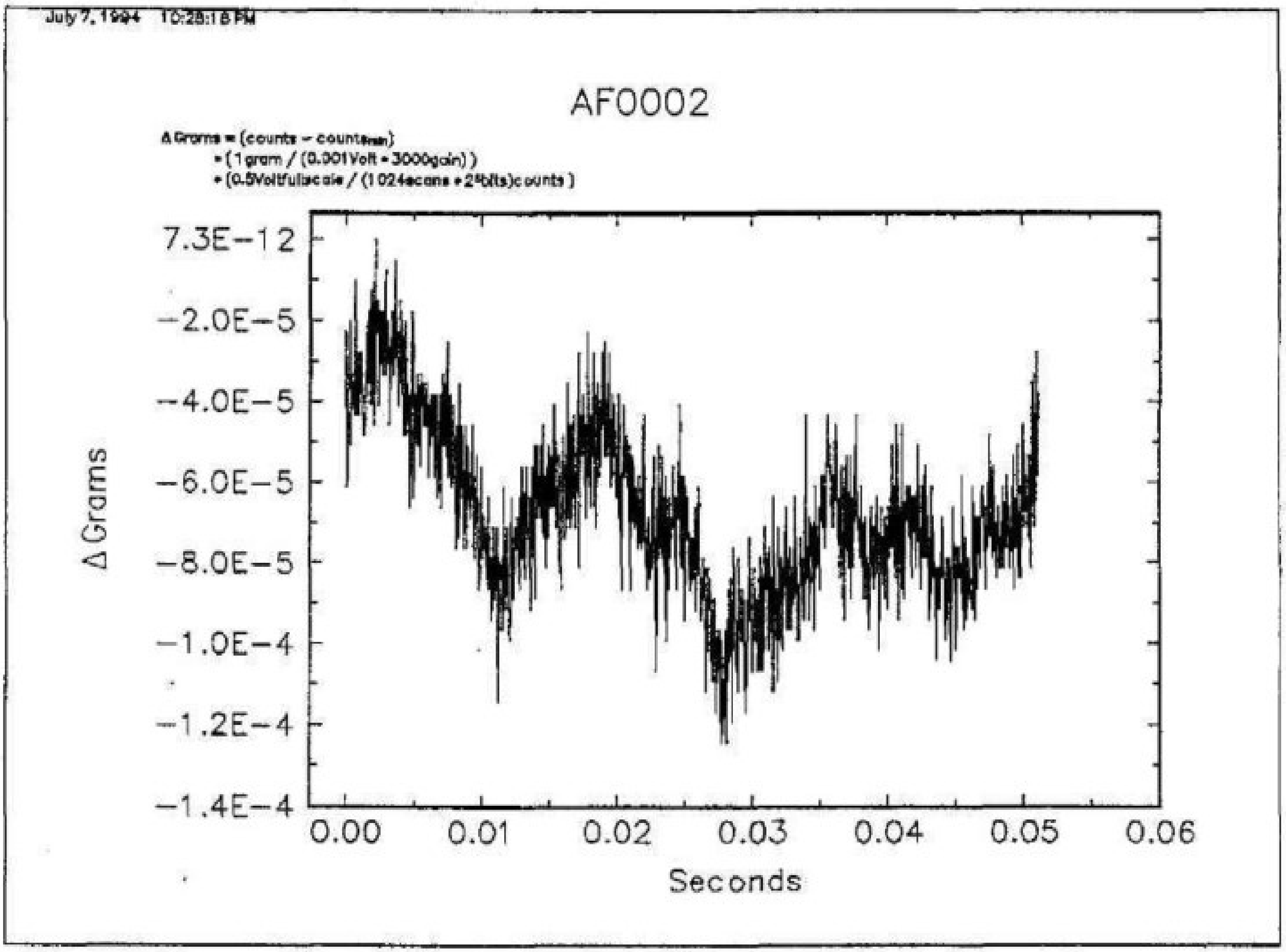
EXP. 1, TEST 2 – PLOT AF0002

For Test 2, the on-intervals were altered to 6 ms in accord with the value of the relaxation time for oriented aluminum nuclei in a metal at room temperature,[73] as illustrated below.



Result: As exhibited in Plot AF0002, there is a well-defined correlation between weight variation and microwave field intensity variation. Note: In processing the data, 32 scans of 1024-point data sets were averaged *(see p. 295)*.

TEST 2 – DATA



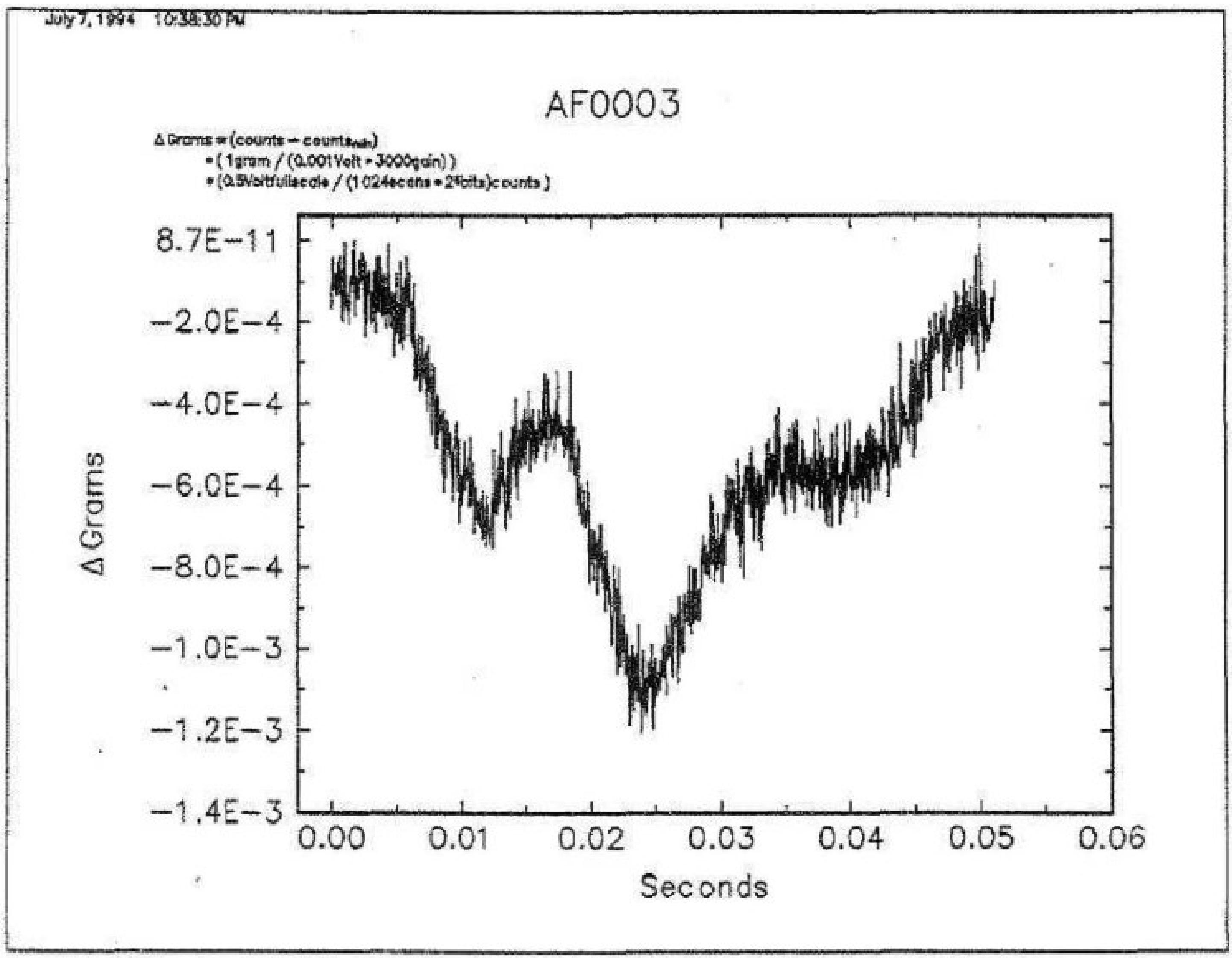
July 7, 1994 10:28:18 PM
AF0002
Δ Grams = (counts − counts_min)
* (1 gram / (0.001Volt * 3000gain))
* (0.5Voltfullscale / (1024scans * 2^16bits)counts)
7.3E−12
−2.0E−5
−4.0E−5
−6.0E−5
−8.0E−5
−1.0E−4
−1.2E−4
−1.4E−4
Δ Grams
0.00
0.01
0.02
0.03
0.04
0.05
0.06
Seconds

EXP. 1, TEST 3 – PLOT AF0003

For Test 3, the conditions of Test 2 were repeated except that more data-point averaging was introduced.

Result: As exhibited in Plot AF0003, much of the noise shown in Plot AF0002 has been suppressed by the increased averaging, and the correlation between weight variation and microwave field intensity is more prominently displayed.

TEST 3 – DATA

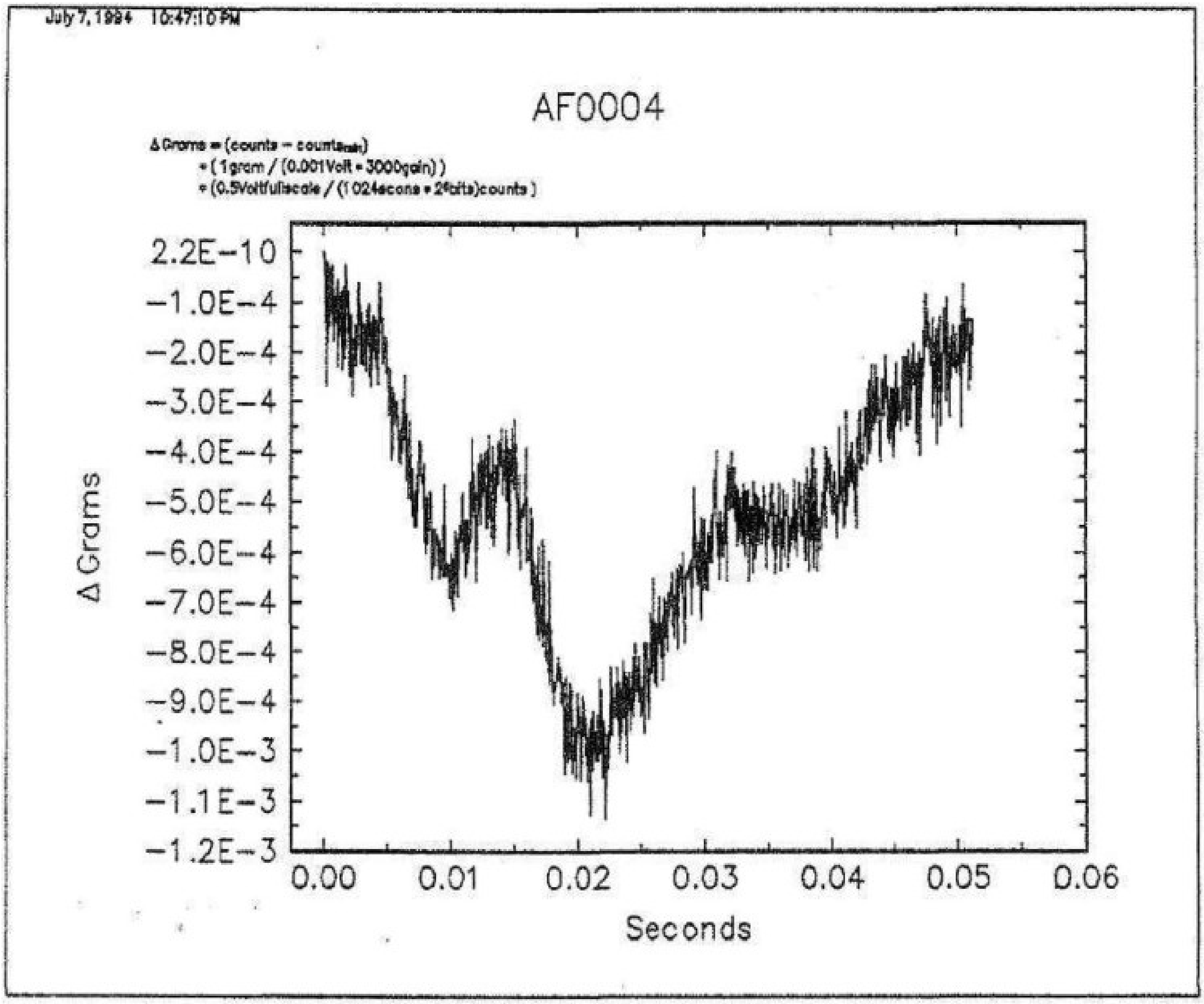


EXP. 1, TEST 4 – PLOT AF0004

For Test 4, the on-off intervals were all altered to 5 ms, preceded by the 1 ms off-interval shown in the diagram for Test 2.

Result: The correlation of weight variation and microwave field variation is well-defined, as exhibited in Plot AF0004, but the noise level is somewhat larger than in Test 3.

TEST 4 – DATA

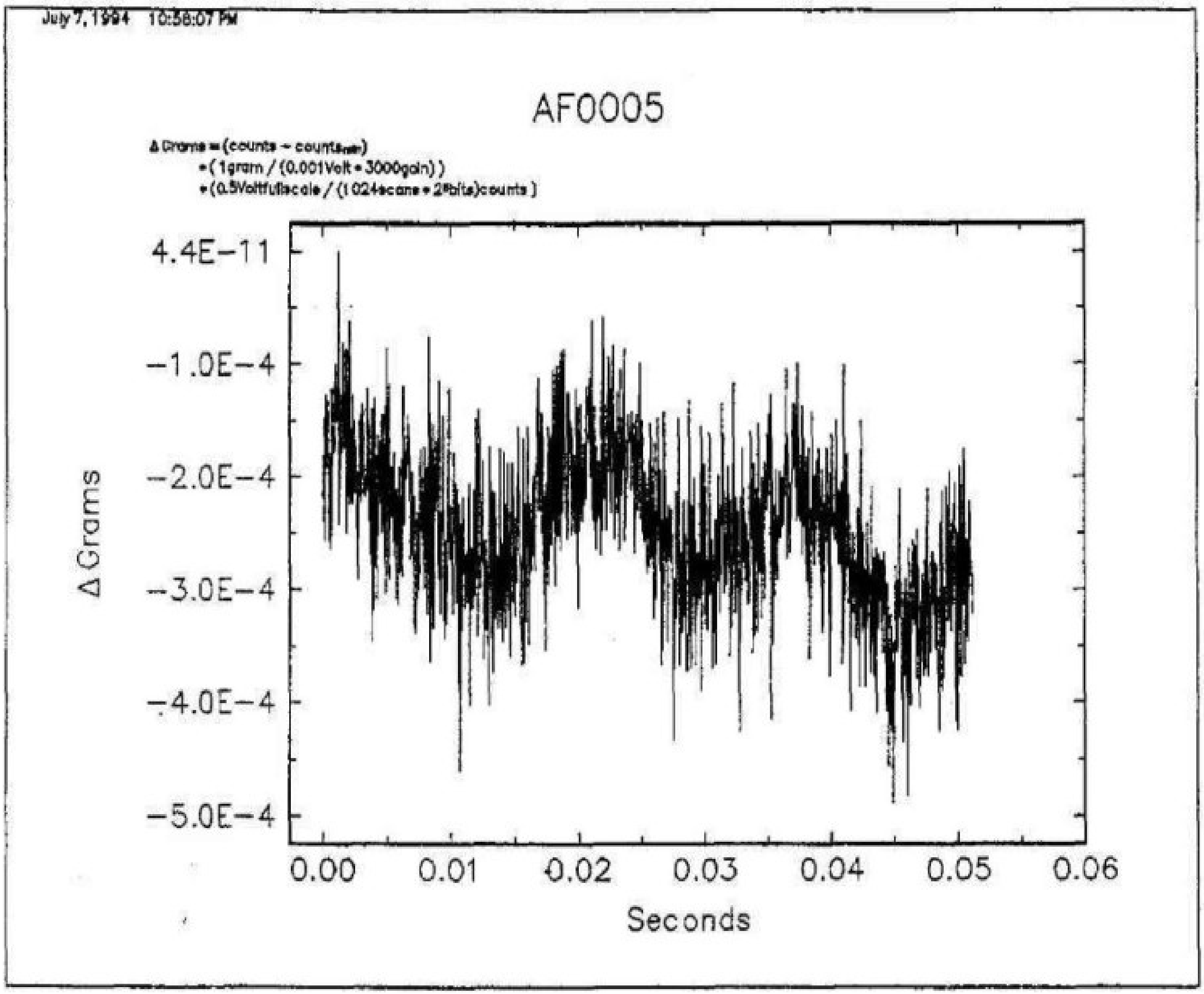


EXP. 1, TEST 5 – PLOT AF0005

For Test 5, the on-off intervals were all set equal to 3 ms, preceded by the 1 ms off-interval as shown in Test 2.

Result: The correlation between weight variation and microwave field variation was not clearly present, as shown in Plot AF0005.

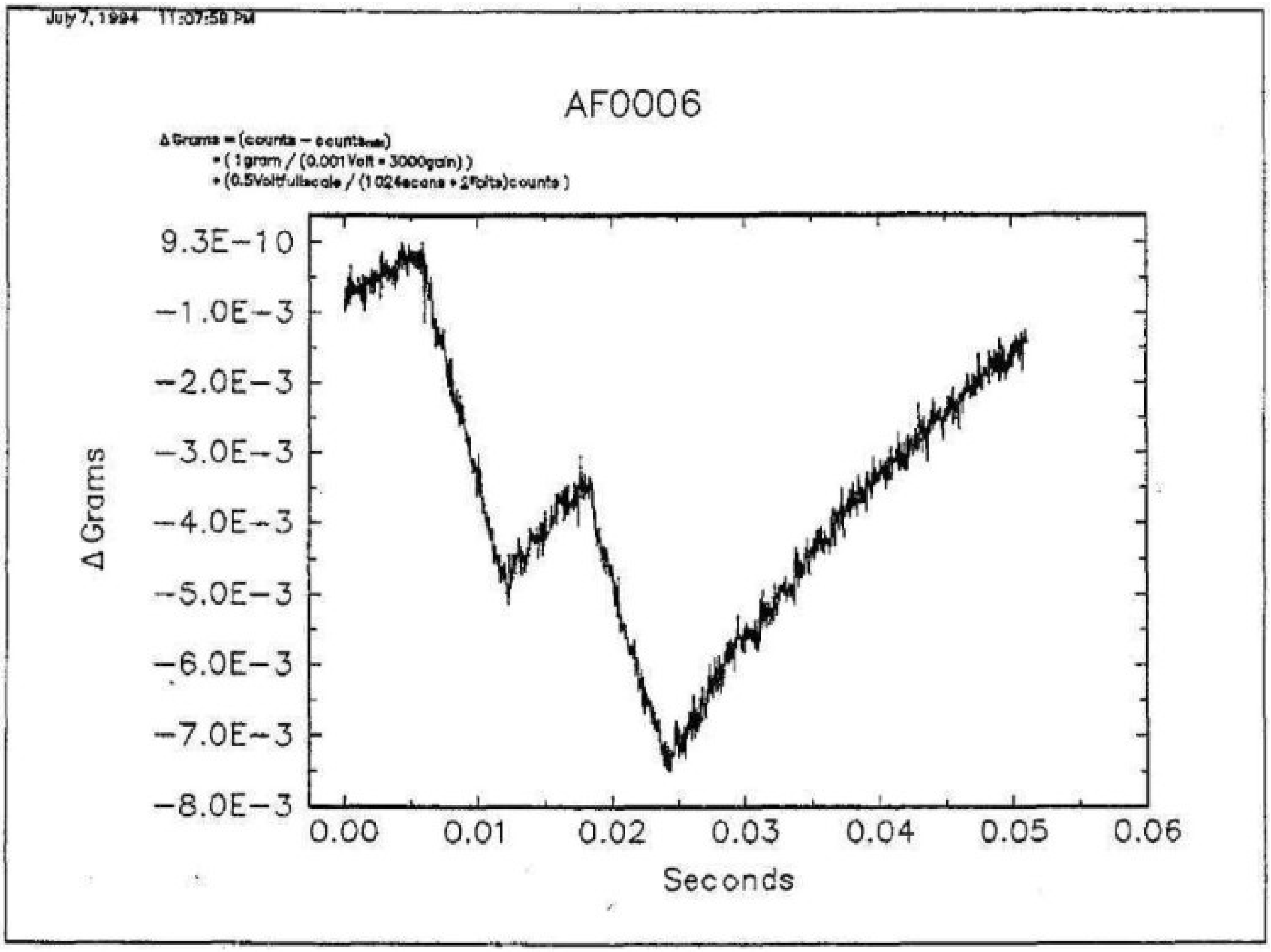
TEST 5 – DATA



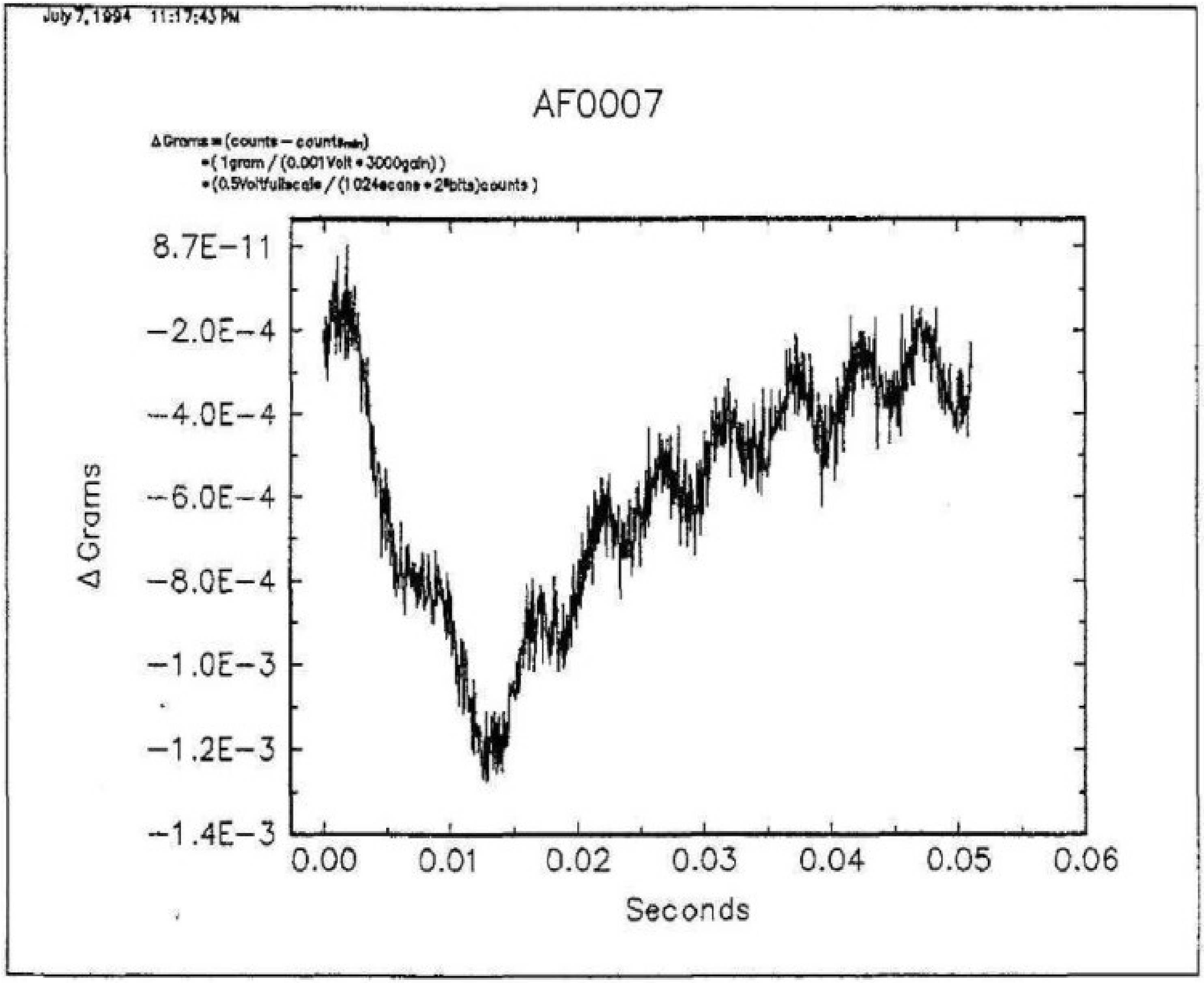
EXP. 1, TESTS 6, 7, AND 8

For tests 6, 7, and 8 some variations in test conditions were instituted. However, during this period the engineer was making changes in the data-gathering instrumentation faster than could be followed by the experimenters and the data exhibited in Plots AF0006, AF0007, and AF0008 could not be interpreted readily in terms of well-defined experimental conditions.

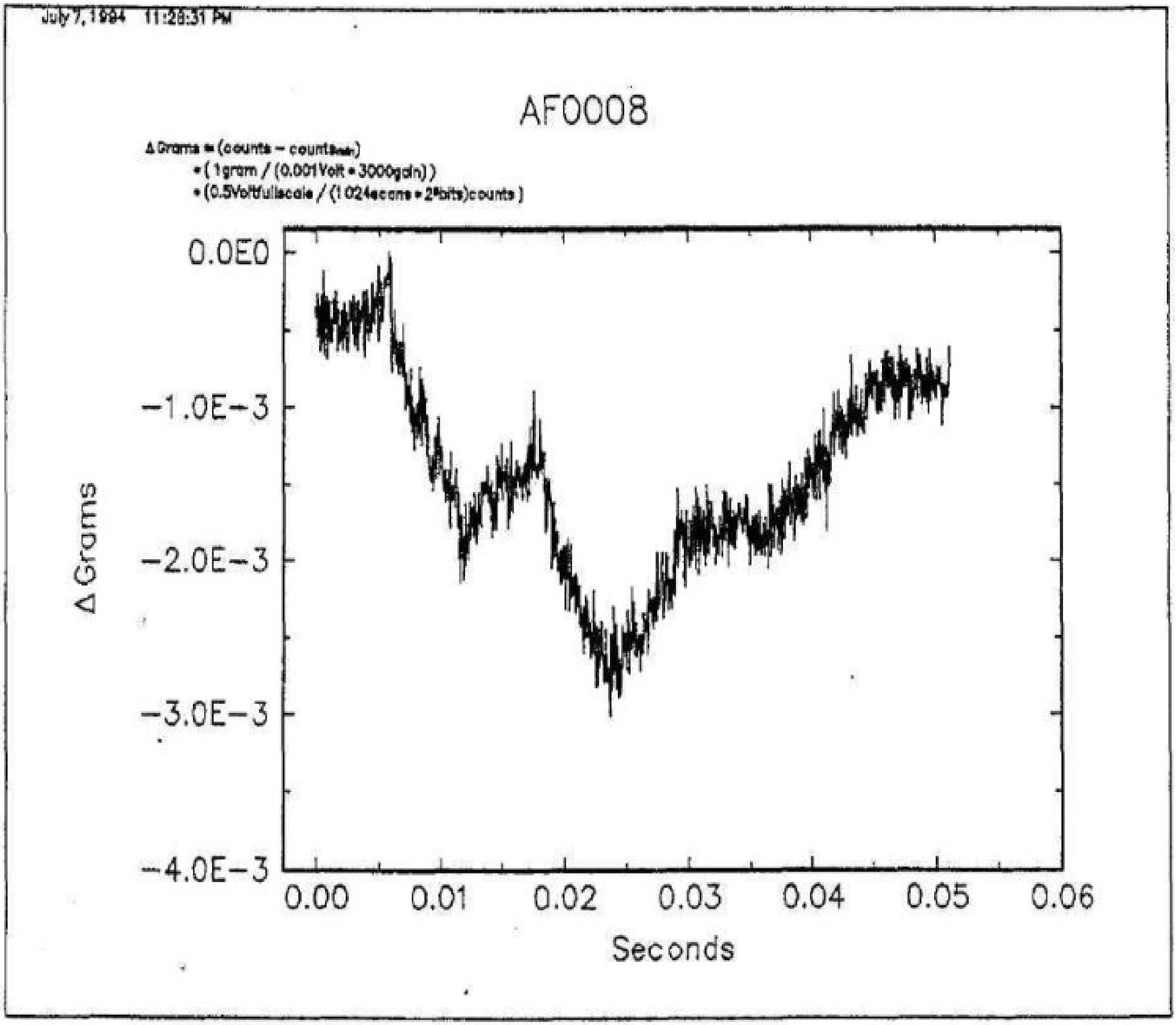
EXP. 1, TEST 6 – PLOT AF0006



EXP. 1, TEST 7 – PLOT AF0007



EXP. 1, TEST 8 – PLOT AF0008



EXP. 1, TEST 9 – ALUMINUM WITHOUT IRON

An additional test was conducted using pure aluminum without iron inclusions. The microwave cycle was the same as in Test 3 above. A correlation was observed between weight variation and variation in microwave field intensity. The observation is in accord with data on the orientation of aluminum nuclei in metallic aluminum in *Physical Review*[74] and the model for a correlation between nuclei orientation and disorientation and weight alteration of a given sample.

No chart exists for this test run.

END OF EXPERIMENT 1

The experiments were terminated at 1450 hrs.

---

72 *J.J. Spokas and C. P. Slichter, "Nuclear Relaxation in Aluminum,* "Physical Review *113 (1462) 1959*

73 *Ibid, Spokas and Slichter, p. 297*

74 *Ibid, Spokas and Slichter, p. 297*

Chapter 41

EXPERIMENT 2

June 17, 1994

CALIBRATION AND TESTING FOR A JUNE 18, 1994, DEMONSTRATION

At 1736 hrs, June 17, 1994, calibration for a June 18, 1994, demonstration was begun. The demonstration is for a potential investor. The cylindrical sample used for the calibration and demonstration is composed of the same Al-Fe powdered material used in Experiment 1 (May 26).

The same apparatus used in Experiment 1 was employed in calibration and testing. The on-off intervals for the microwave input were the same as employed in Test 2 of Experiment 1 (i.e. 6 ms).

The correlation of weight and microwave field alteration was well-defined and corresponded to Plot AF0006, as measured with a scale on a computer screen. It was then decided that the apparatus was ready for the demonstration. AF0006.dat file was duplicated, copied to another file and labeled AF2001.dat for use in the June 18 demonstration, since the system has worked well with this data file, giving the best output for the 6 ms on-off intervals for the microwave field.

END OF EXPERIMENT 2.

Chapter 42

EXPERIMENT 3

June 18, 1994

DEMONSTRATION FOR A POTENTIAL INVESTOR

At 1400 hrs the experimental procedures began with a check to verify that the June 17 calibration was still valid and the apparatus was functioning properly. All checks of the electronic test equipment were performed in the same manner as in Experiment 1 (May 26). It was found that all system parameters were functioning properly.

Present at the experiments were Frederick Alzofon, [*names withheld by F.A.*].

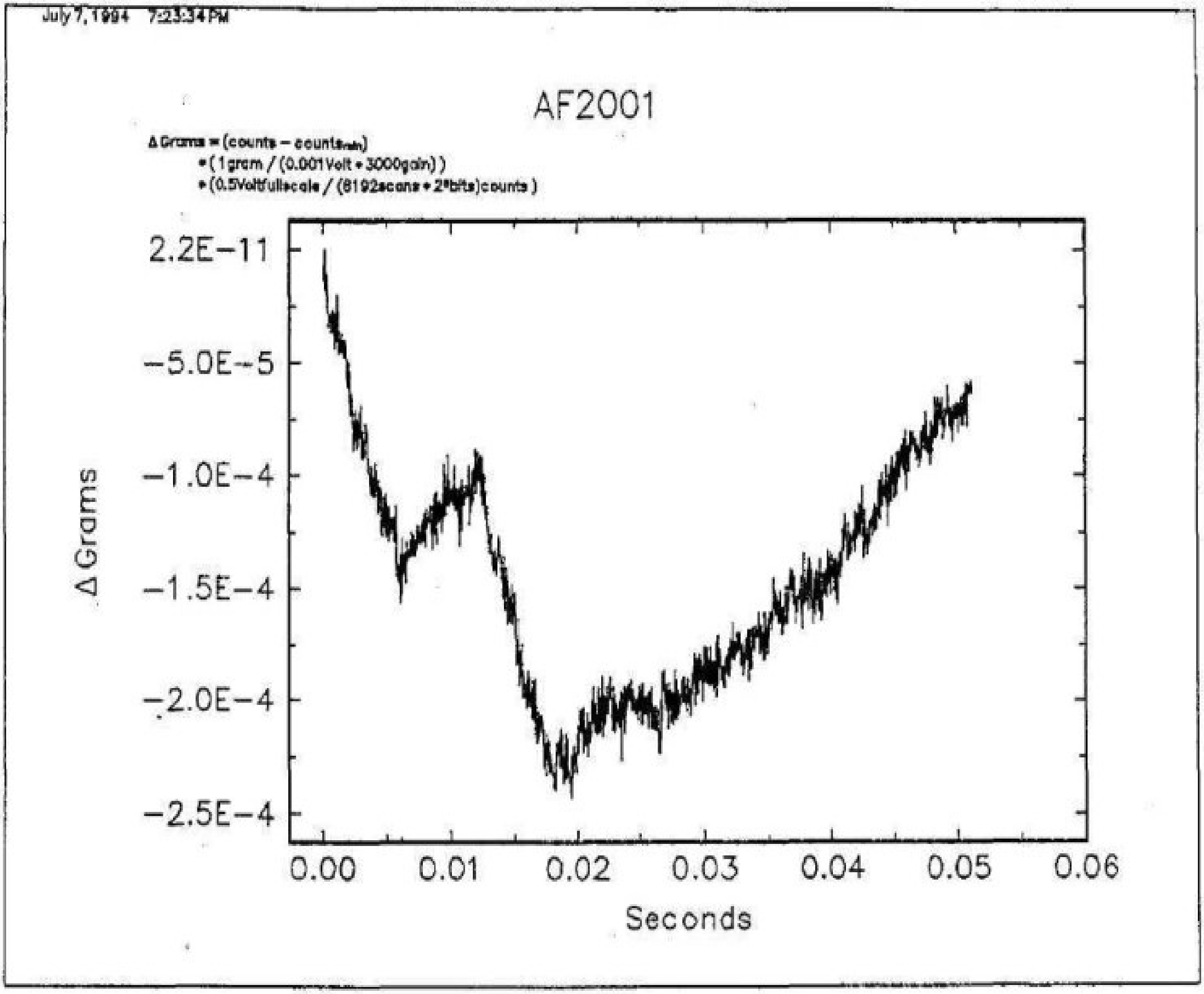
For Experiment 3, 8192 "time bins" were programmed and an average was taken over 256 values of weight increments for each time bin. The microwave input pulses were chosen as in Experiment 1, Test 2, unless otherwise stated.

Tests, results, and data charts are shown below.

EXP. 3, TEST 1 – PLOT AF2001

The results of the experiment for Test 1 are shown in Plot AF2001. The correlation between microwave intensity and weight alteration is very clear.

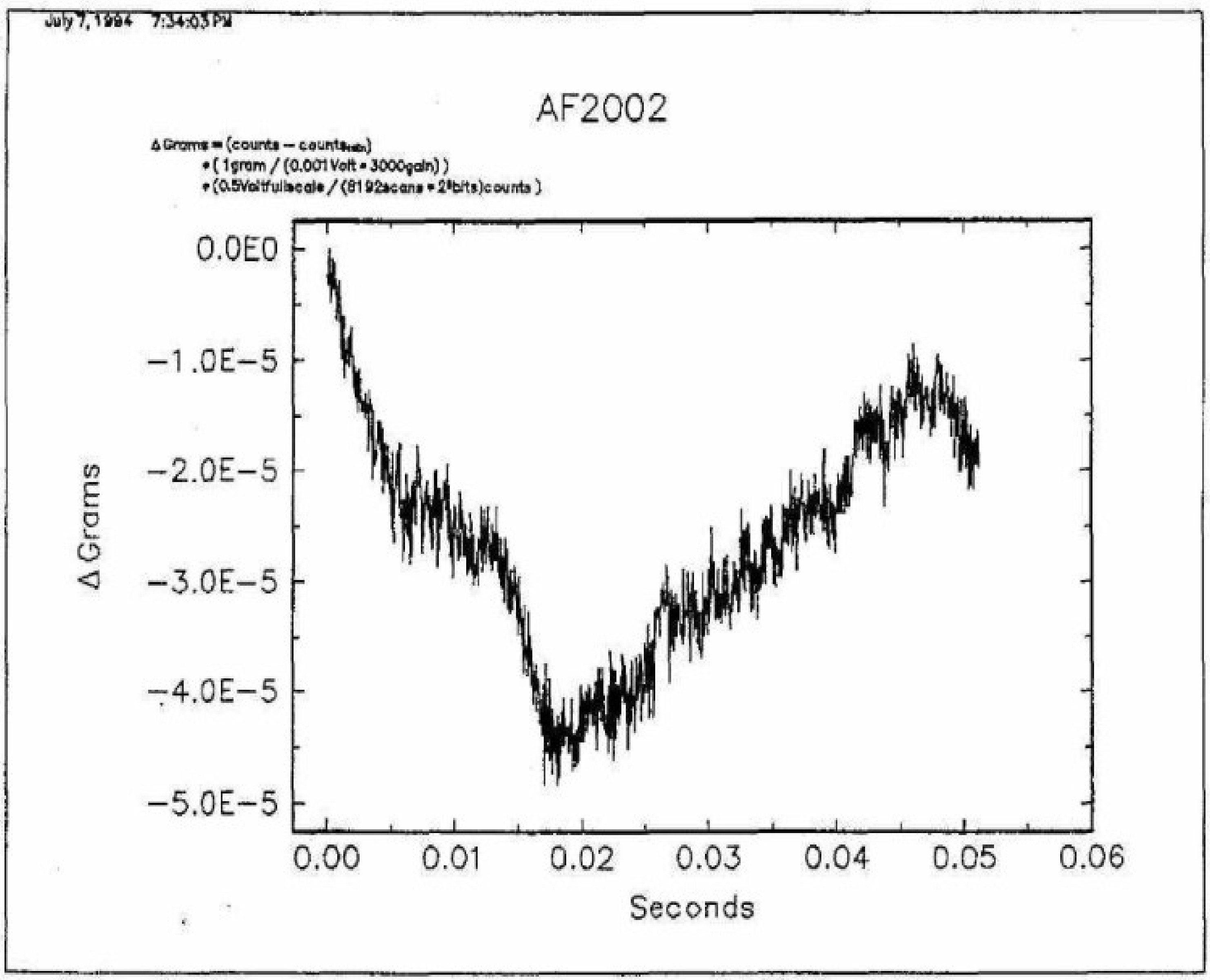
TEST 1 – DATA



EXP. 3, TEST 2 – PLOT AF2002

The result of Test 2 is shown in Plot AF2002. Some correlation is evident between microwave intensity and weight alteration. There were some difficulties in computer processing of the data and these were reflected in the lack of a correlation, such as clearly shown in Test No. 1.

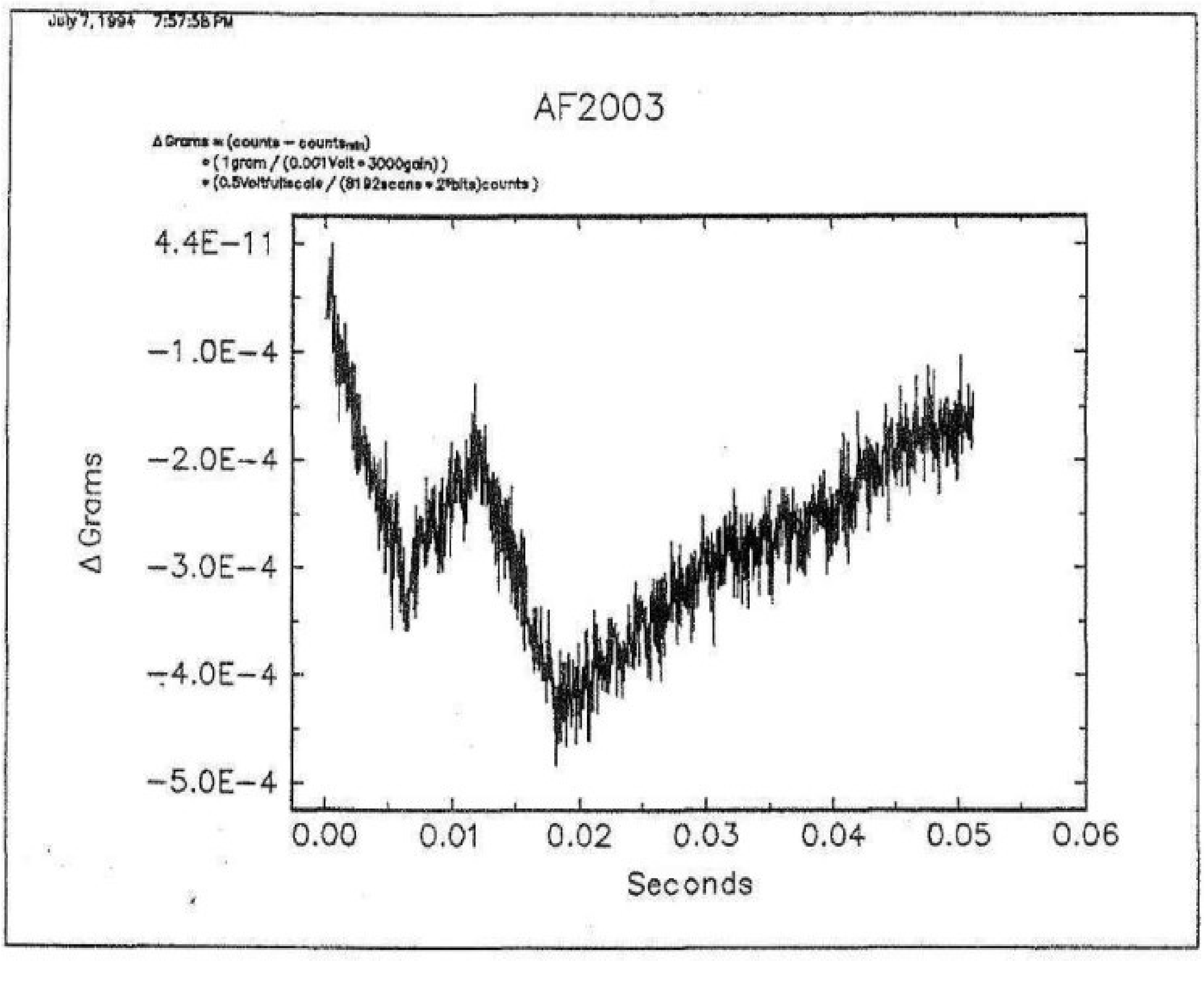
TEST 2 – DATA



EXP. 3, TEST 3 – PLOT AF2003

Having corrected the data processing problems of Test 2, the results of Test 3 are depicted in Plot AF2003. The correlation between microwave field intensity and weight increments is very clear.

TEST 3 – DATA

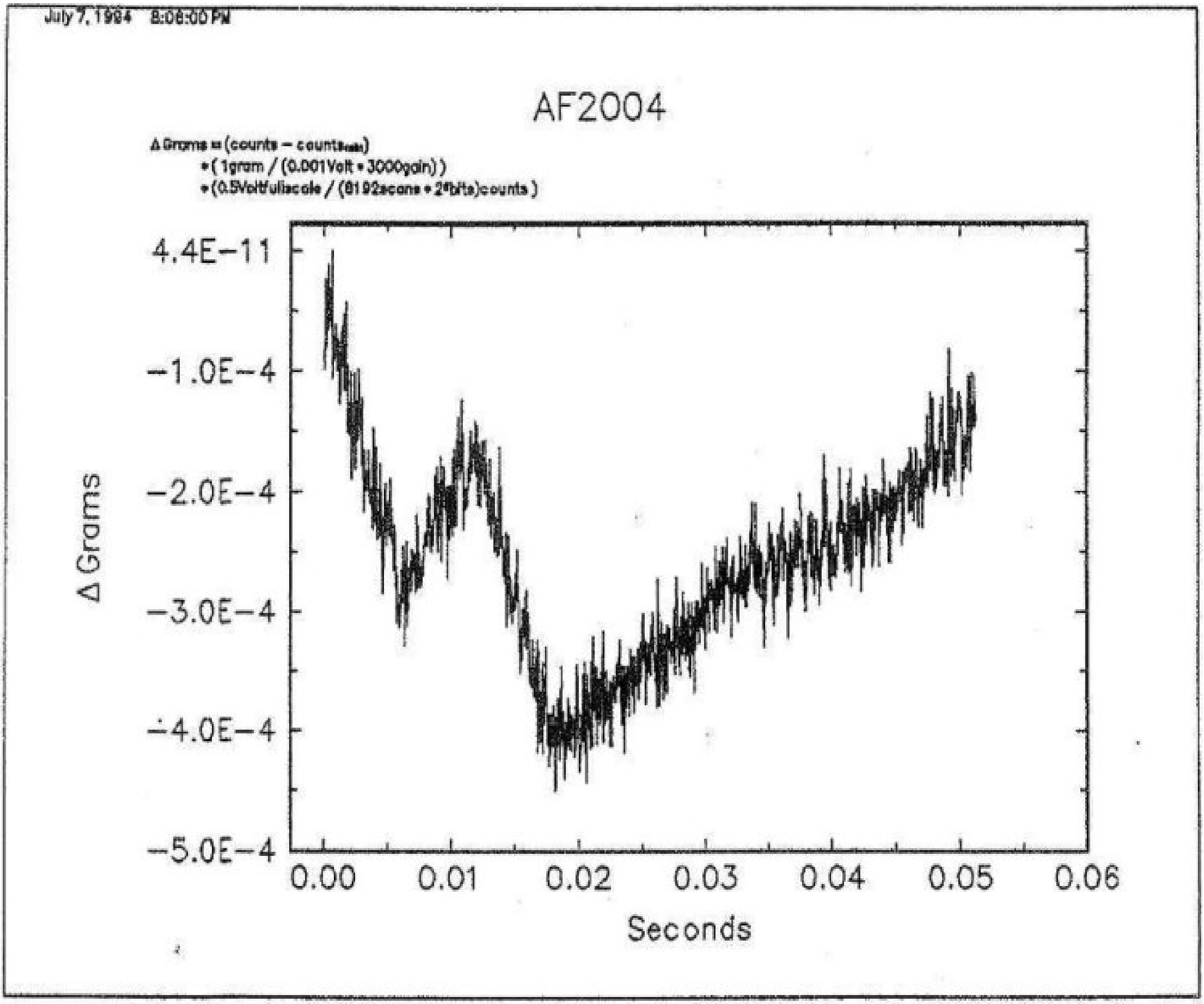


EXP. 3, TEST 4 – PLOT AF2004 (CONTROL)

The current supplying the electromagnet to produce a constant magnetic field was switched off for Test No. 4 in order to test the role of the constant magnetic field in the correlations noted above. There remained a weak residual magnetic field whose magnitude was not measured. The correlation between microwave field intensity and weight increments is still present.

It is felt that a plausible explanation for this persistence is that the fractional alteration in resonant microwave frequency is equal to the fractional variation in the constant magnetic field. Since the resonant frequency is so large (about 9.5 GHz), the bandwidth must also be very large, corresponding to alterations in the magnetic field. Plot AF2004 illustrates the correlation observed.

TEST 4 – DATA

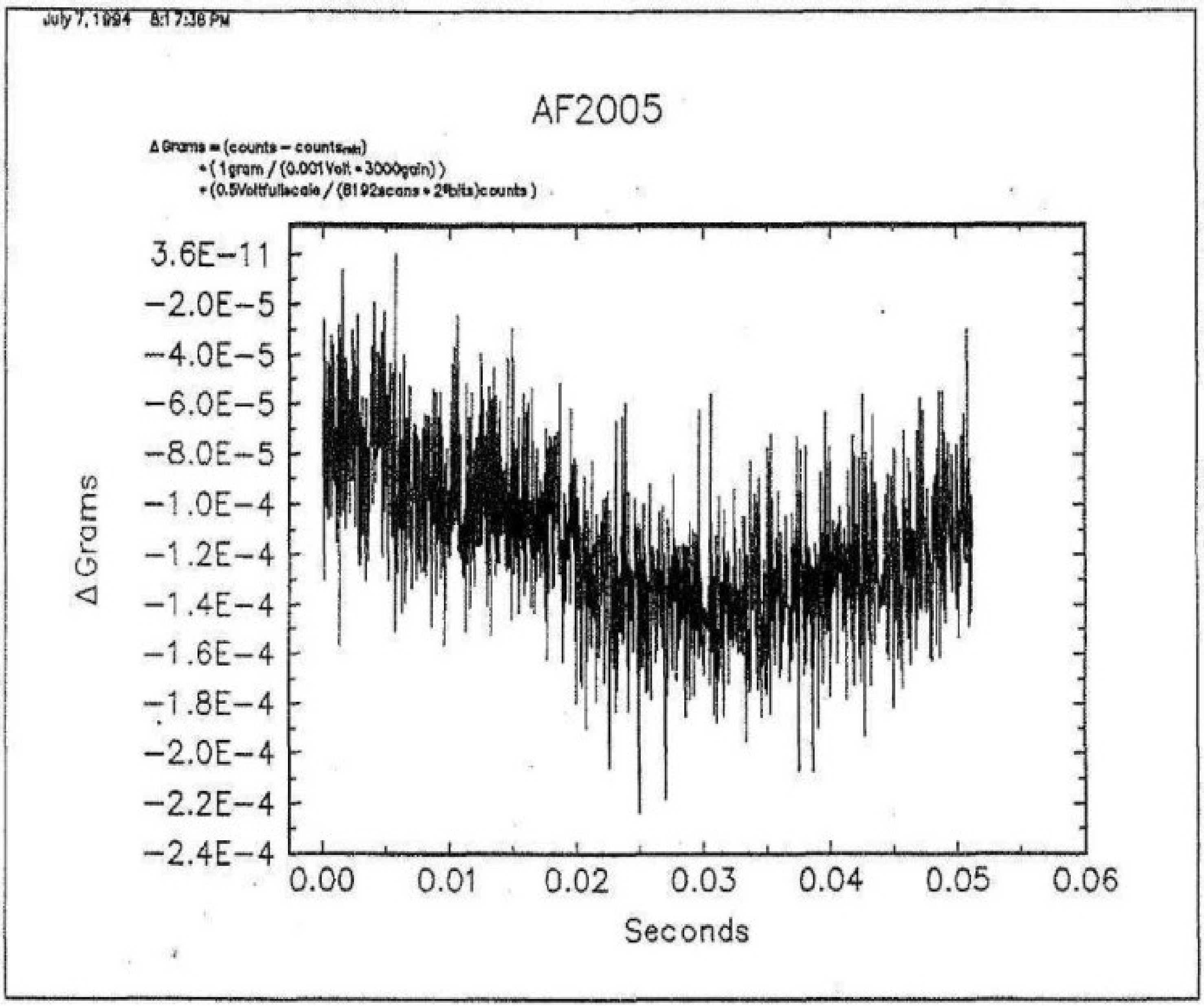


July 7, 1994 8:06:00 PM
AF2004
Δ Grams = (counts − counts
* (1gram / (0.001Volt * 3000gain))
* (0.5Voltfullscale / (8192scans * 2^bits)counts)
4.4E−11
−1.0E−4
−2.0E−4
−3.0E−4
−4.0E−4
−5.0E−4
Δ Grams
0.00
0.01
0.02
0.03
0.04
0.05
0.06
Seconds

EXP. 3, TEST 5 – PLOT AF2005 (CONTROL)

In Test 5, both the constant magnetic field and the microwave field were switched off. Plot AF 2005 shows no variation in weight recorded.

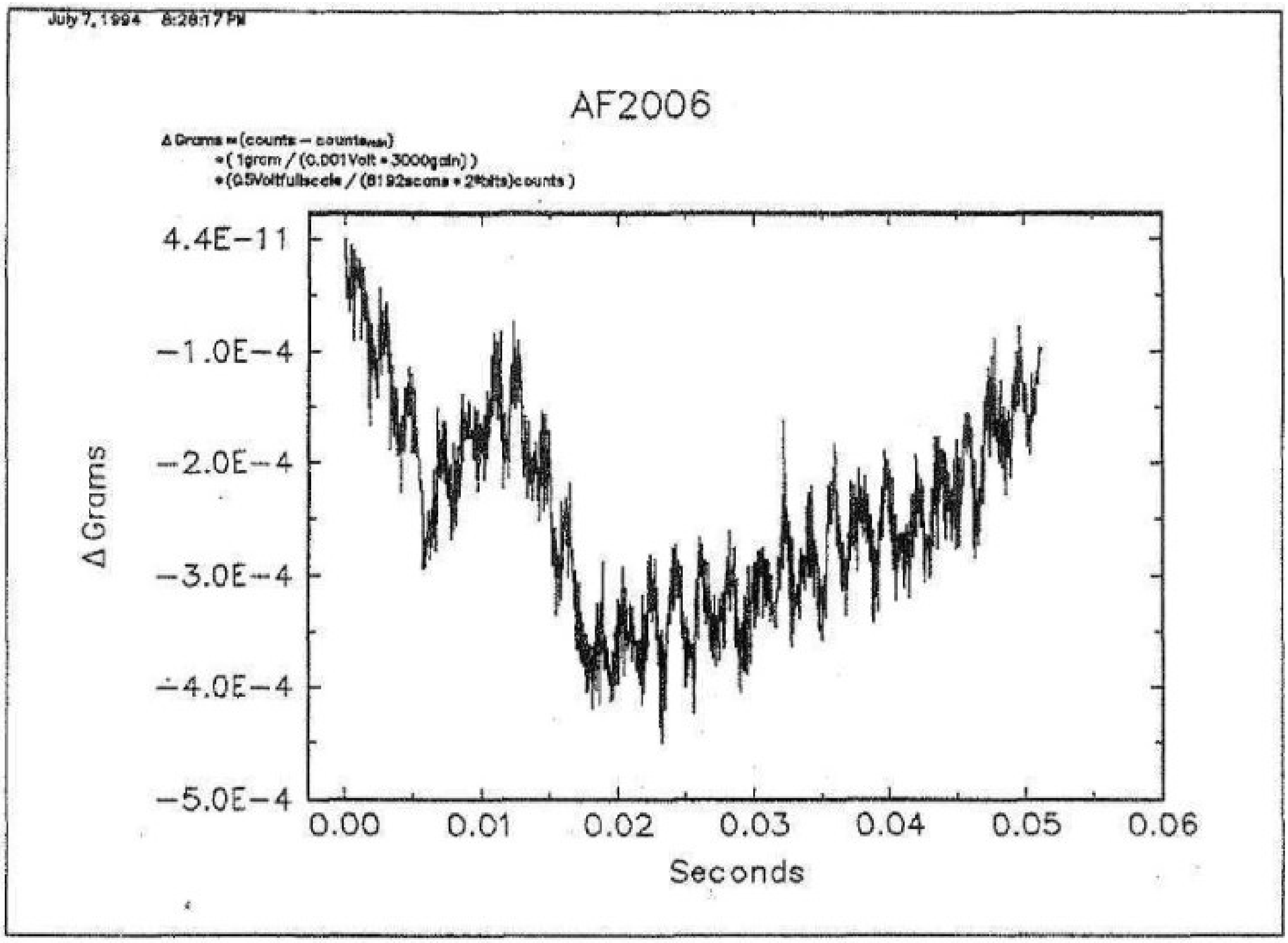
TEST 5 – DATA



EXP. 3, TEST 6 – PLOT AF2006

In Test No. 6, both the constant magnetic field and microwave field were restored, as in Tests No. 1 to 3. As Plot AF2006 shows, the alteration of weight and the microwave field variation are correlated.

TEST 6 – DATA



END OF EXPERIMENT 3

CONCLUSION

The predicted correlation between pulsed dynamic nuclear orientation and weight alteration has been demonstrated. The weight fluctuations display the pattern predicted by the theory: an upward spike, followed by a drop in weight. The second drop, correlated with the second pulse, is more precipitous than the first, as predicted. When microwave pulses ceased after the second pulse, the weight returns to normal in a smooth line as nuclear orientation in the sample decays.

ILLUSTRATIONS

Figures 1 – 13 below depict the hardware used in the experiment in diagrams and photos.

1) **Block diagram of components**. "EPR unit" means "Electron Paramagnetic Resonance unit," the single most expensive component in the experiment. An EPR is, however, fairly common in university organic chemistry laboratories, where it is used for assaying organic molecules. The unit was probably an early ELEXSYS. Bruker is currently the leading manufacturer.

Diagrams 2 – 5 illustrate custom-machined parts with measurements.

2) **Microwave cavity drawn to scale**. No width or length was given for the body of the cavity, but it is probably 2.5" long (4.5" overall - 2" for connectors). "NC" may mean "not-connected."

3) **Microwave cavity attachment column drawn to scale**.

4) **Wave guide and wave guide beyond cutoff, shown at 50% of actual size**.

5) **Unknown part of device**. This page was unlabeled and unexplained, but included in report.

Figures 6 – 8: Photos of the three main parts of the experimental apparatus taken left to right. Regrettably, the photographic record of the experiment is extremely meager and poor quality. No videos were made. This is probably because none of the participants saw any particular value in it, but concerns over leaks may have played a role, too.

6) **Left side** of apparatus, above the work bench

7) **Center area**, spotlighting the position of the EPR unit

8) **Right side of apparatus**, showing the electronic equipment rack

Figures 9–13: Close-ups of parts and equipment (originals were black-and-white photocopies of poor quality photographs, so these images are extremely grainy, but the objects can be made out).

FIG. 1 – BLOCK DIAGRAM OF MICROWAVE SYSTEM USED IN EXPERIMENTS

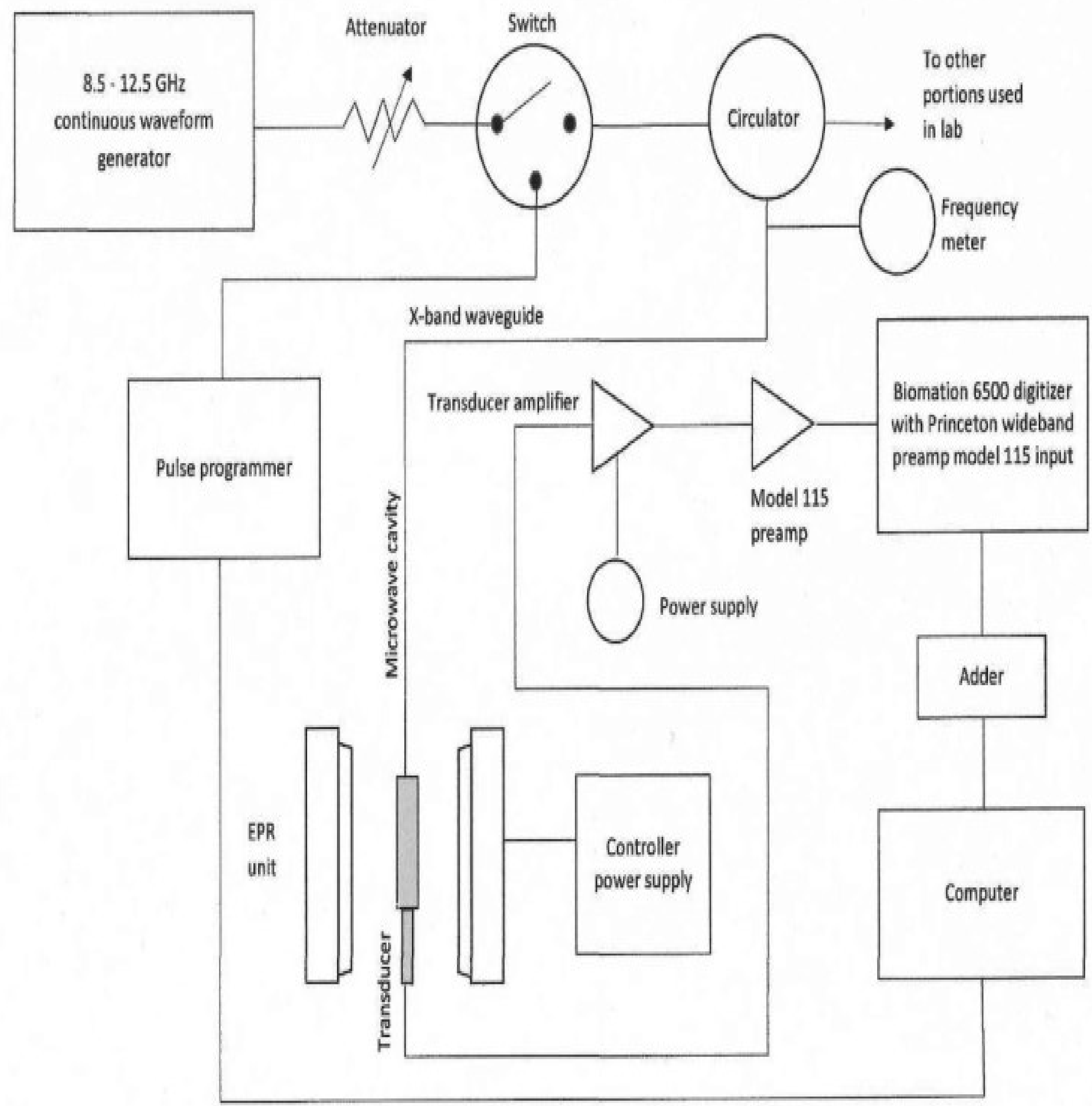


FIG. 2 – MICROWAVE CAVITY

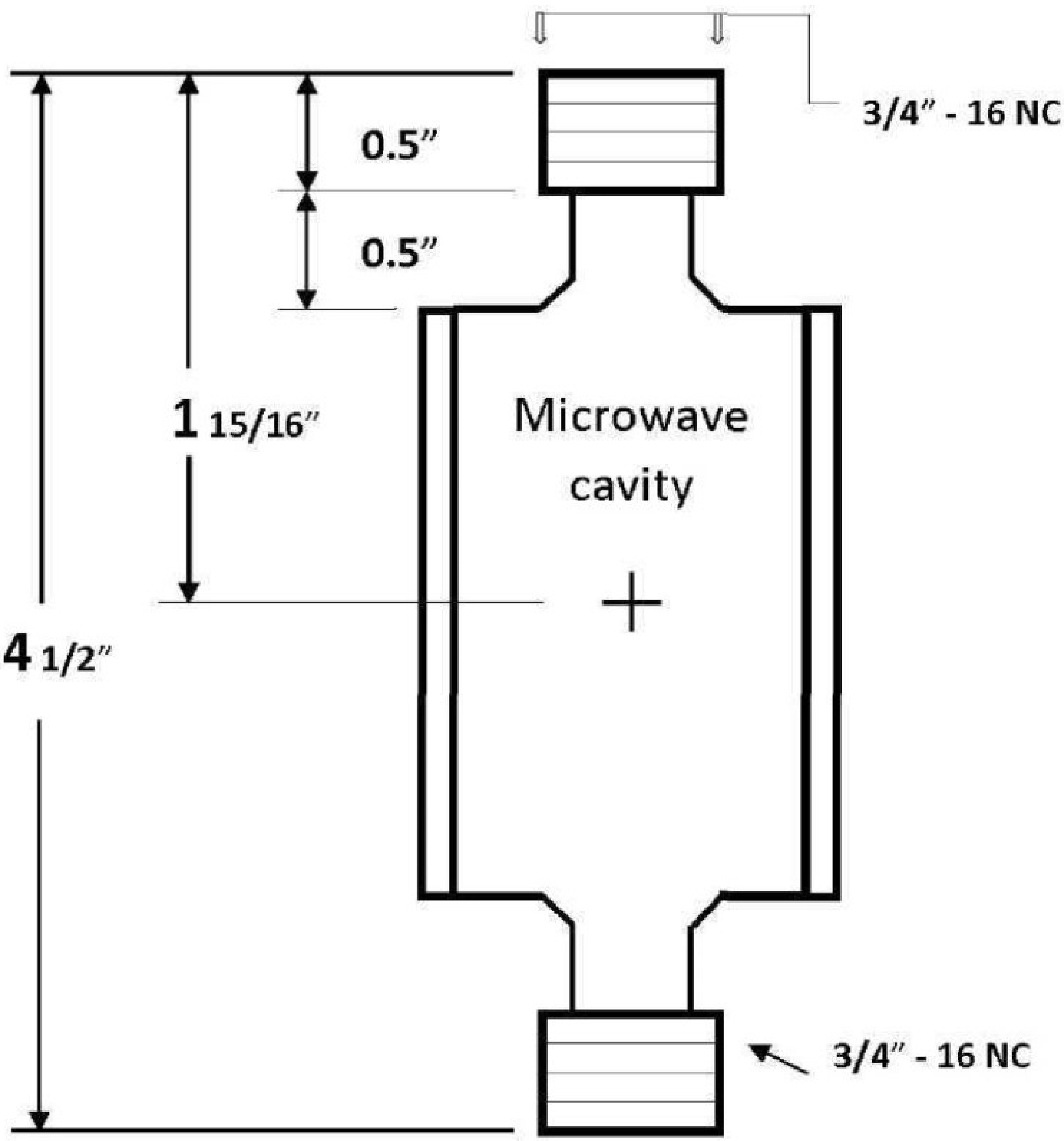


FIG. 3 – WAVE GUIDE AND WAVE GUIDE BEYOND CUTOFF

(also see Figs. 10 and 11 below)

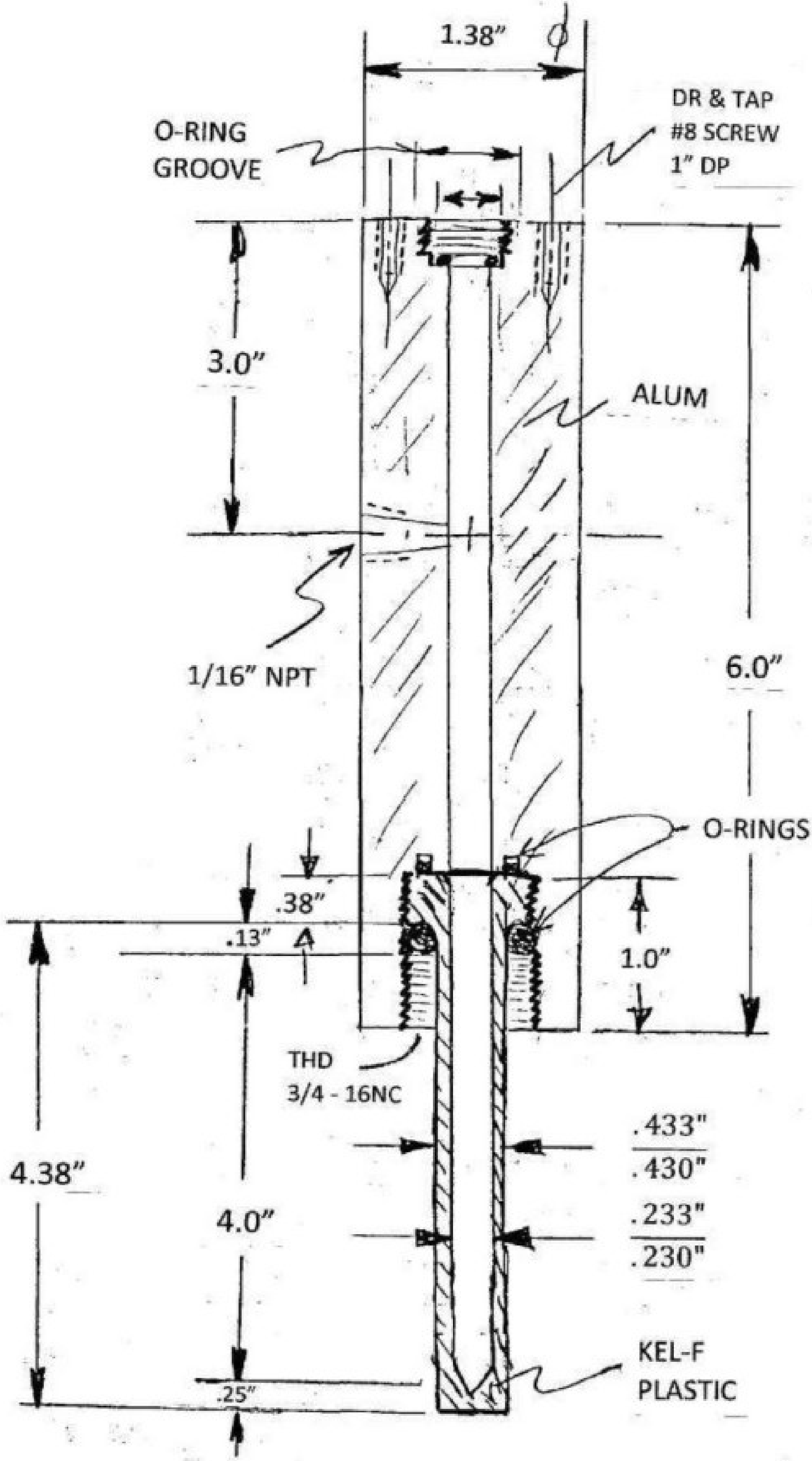

1.38" ϕ
O-RING
GROOVE
DR & TAP
#8 SCREW
1" DP
3.0"
ALUM
1/16" NPT
6.0"
O-RINGS
.38"
.13"
1.0"
THD
3/4 - 16NC
.433"
.430"
4.38"
4.0"
.233"
.230"
KEL-F
PLASTIC
.25"

FIG. 4 – MICROWAVE CAVITY ATTACHMENT COLUMN

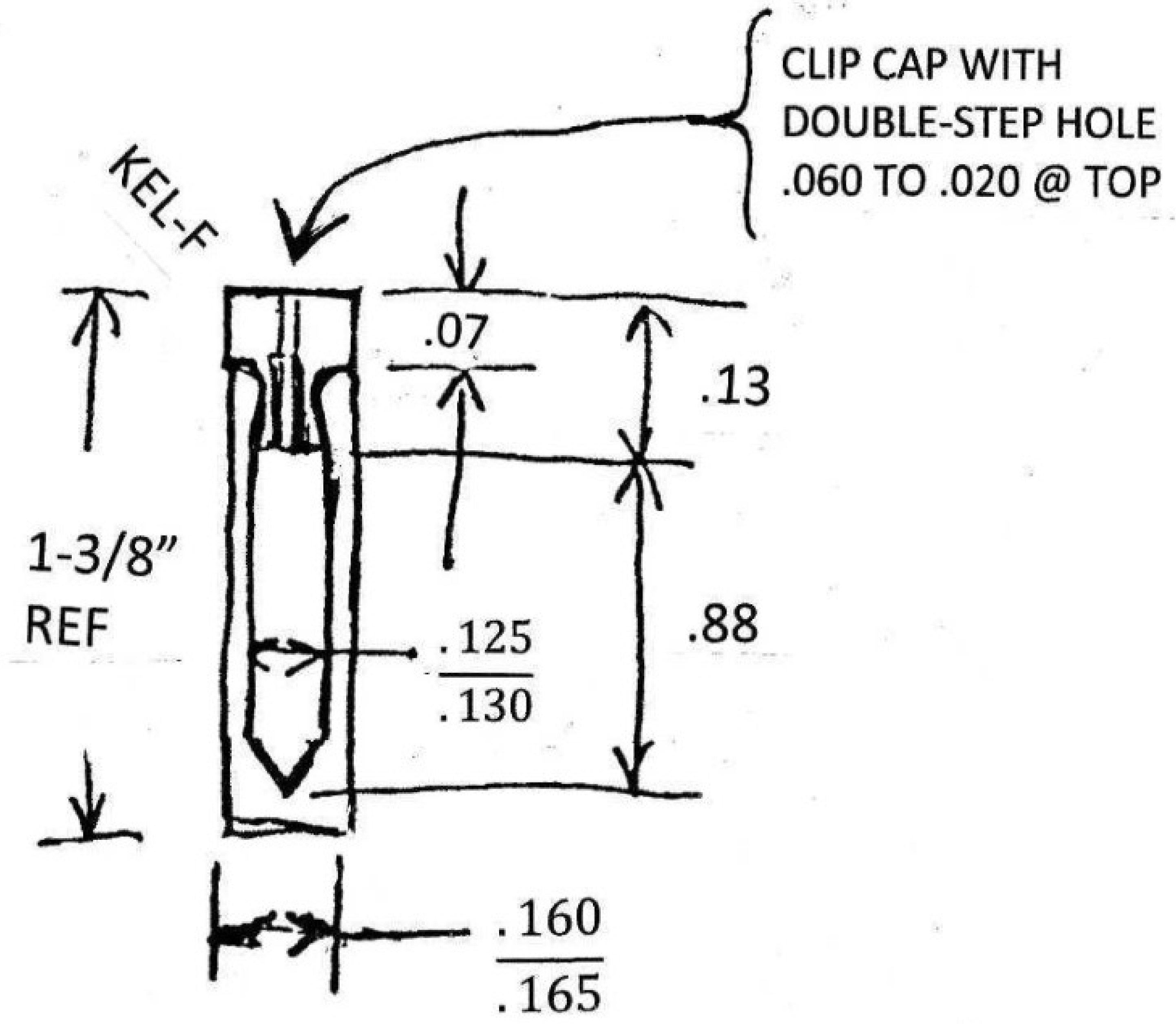
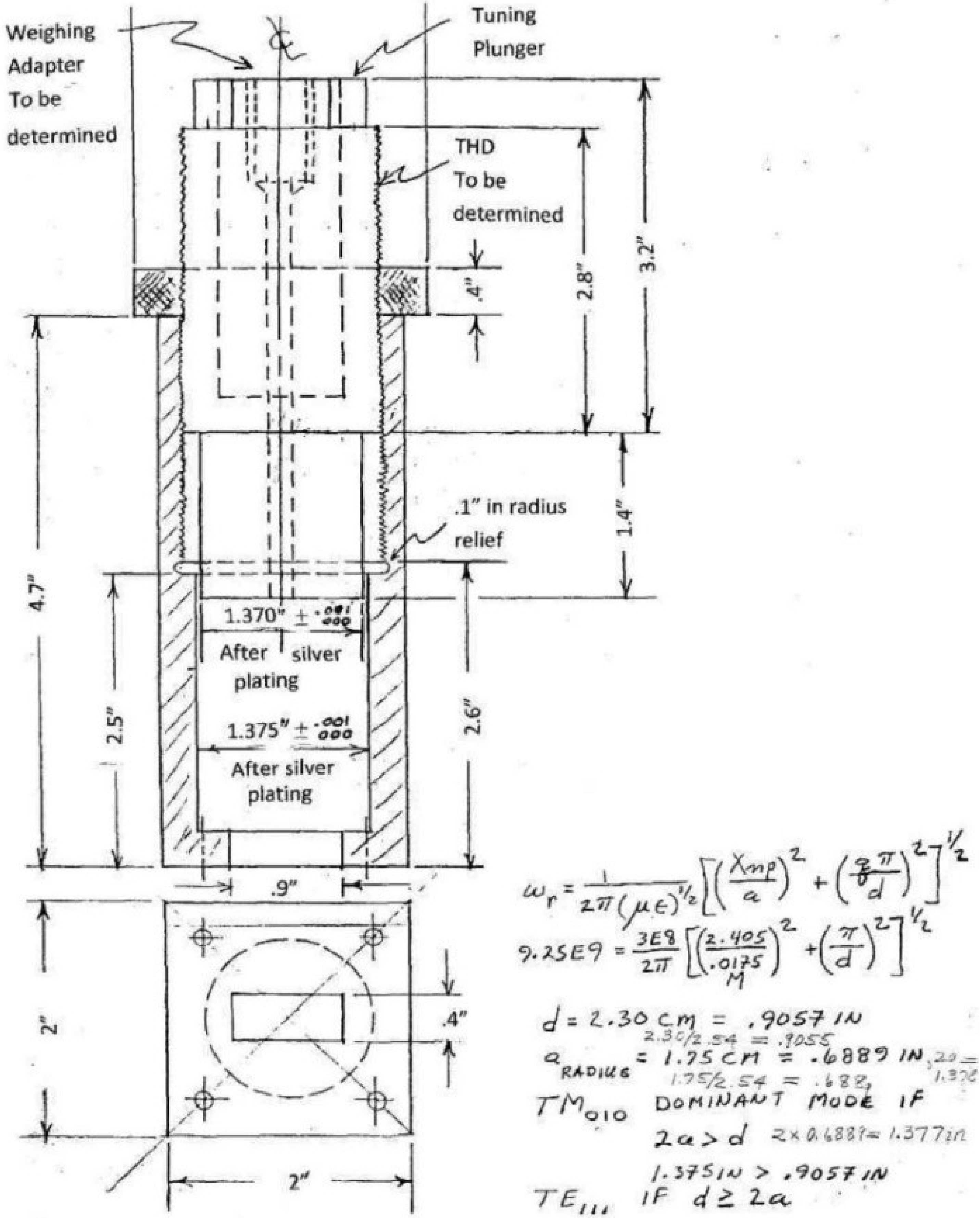


FIG. 5 – UNLABELED PART



Handwriting at bottom-right is apparently a combination of engineer (dark) and F. Alzofon's *notes (light). Printed legends were substituted for handwritten in diagram (no other changes).*

FIG. 6 – LEFT SIDE OF APPARATUS ABOVE WORK BENCH


Hammermill
Hammermill

FIG. 7 – CENTER AREA, SPOTLIGHTING EPR UNIT (BELOW BENCH)

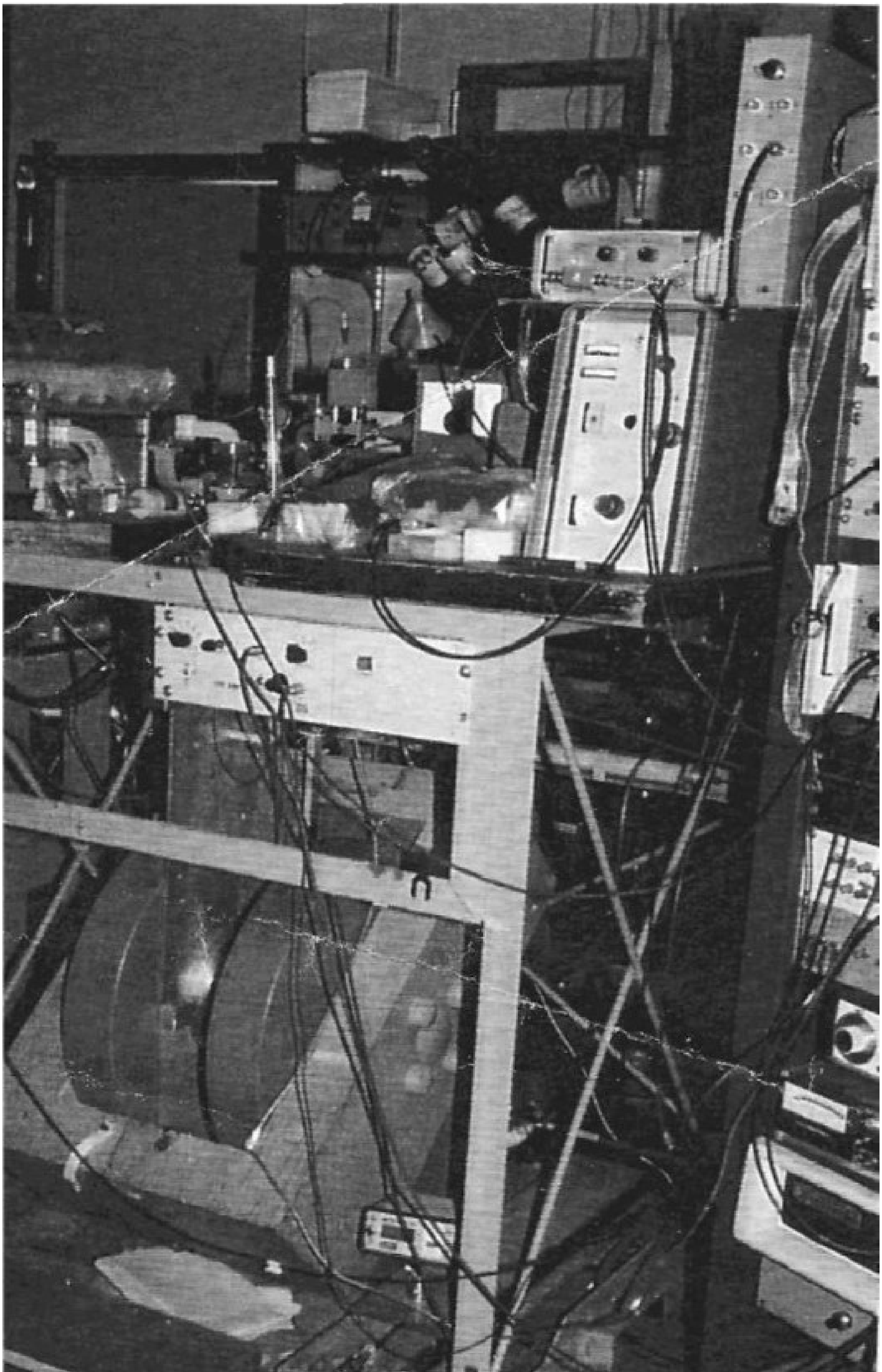


FIG. 8 – RIGHT SIDE, EQUIPMENT RACK

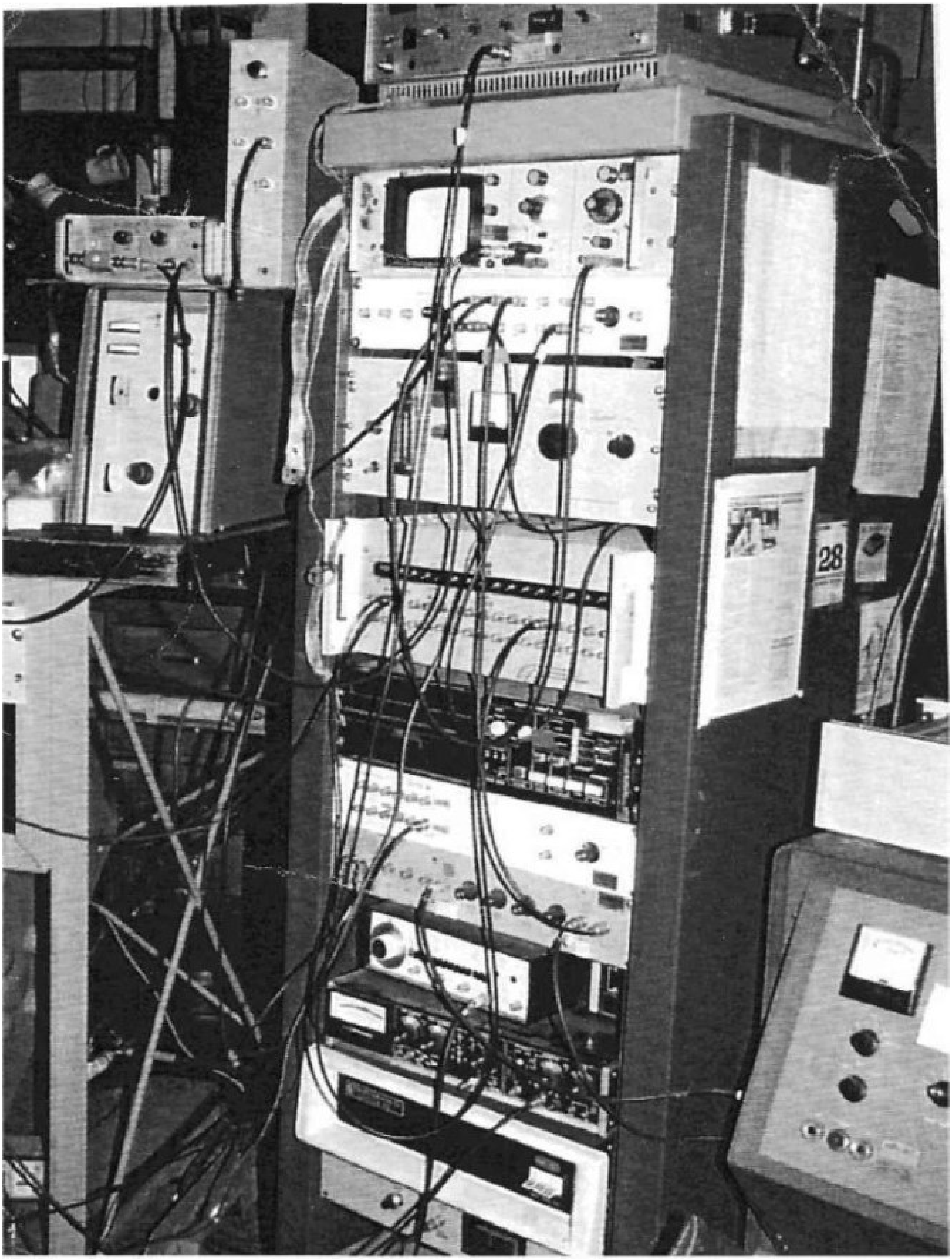

28

FIG. 9 – MICROWAVE CAVITY (SHOWN IN FIG. 2)

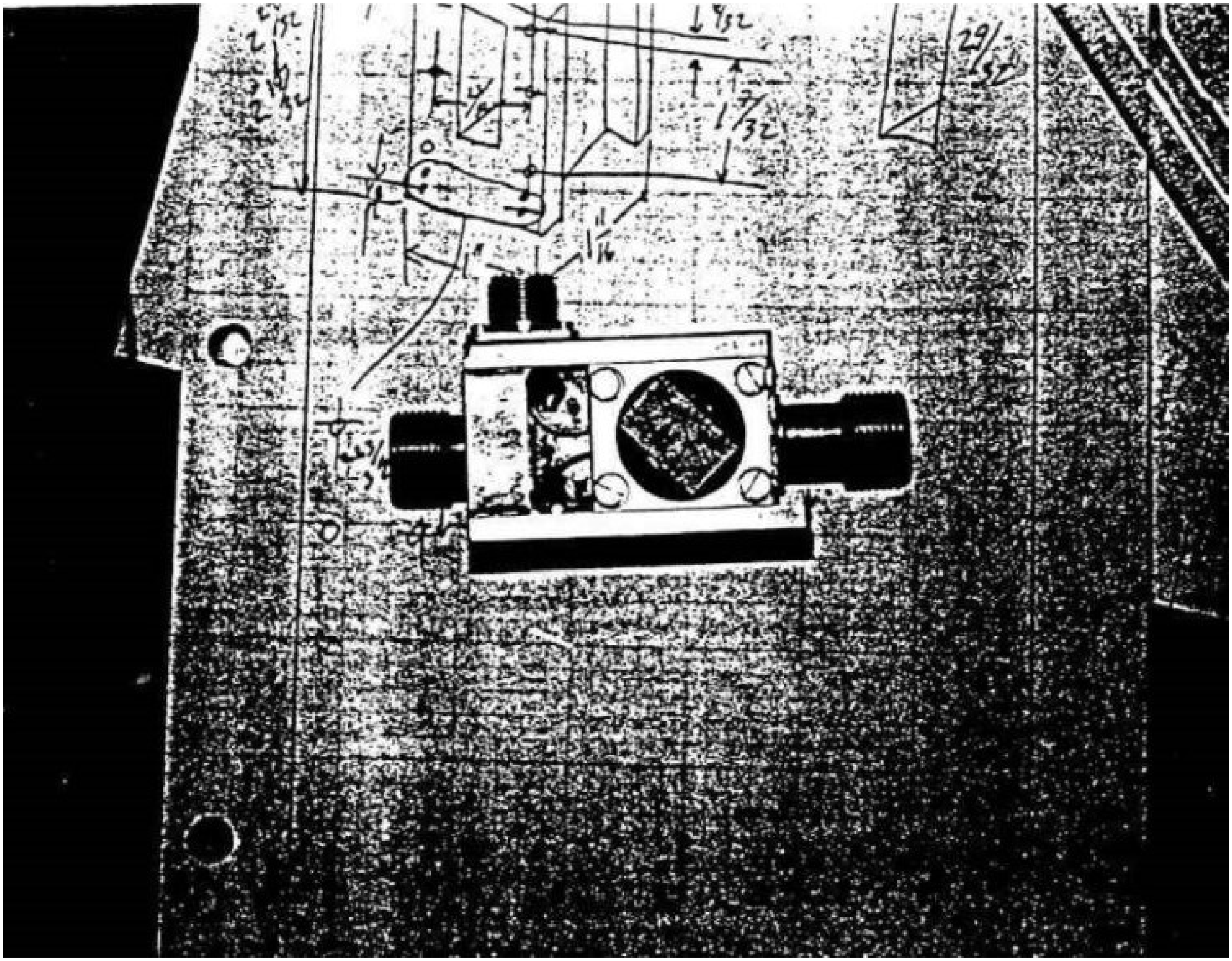
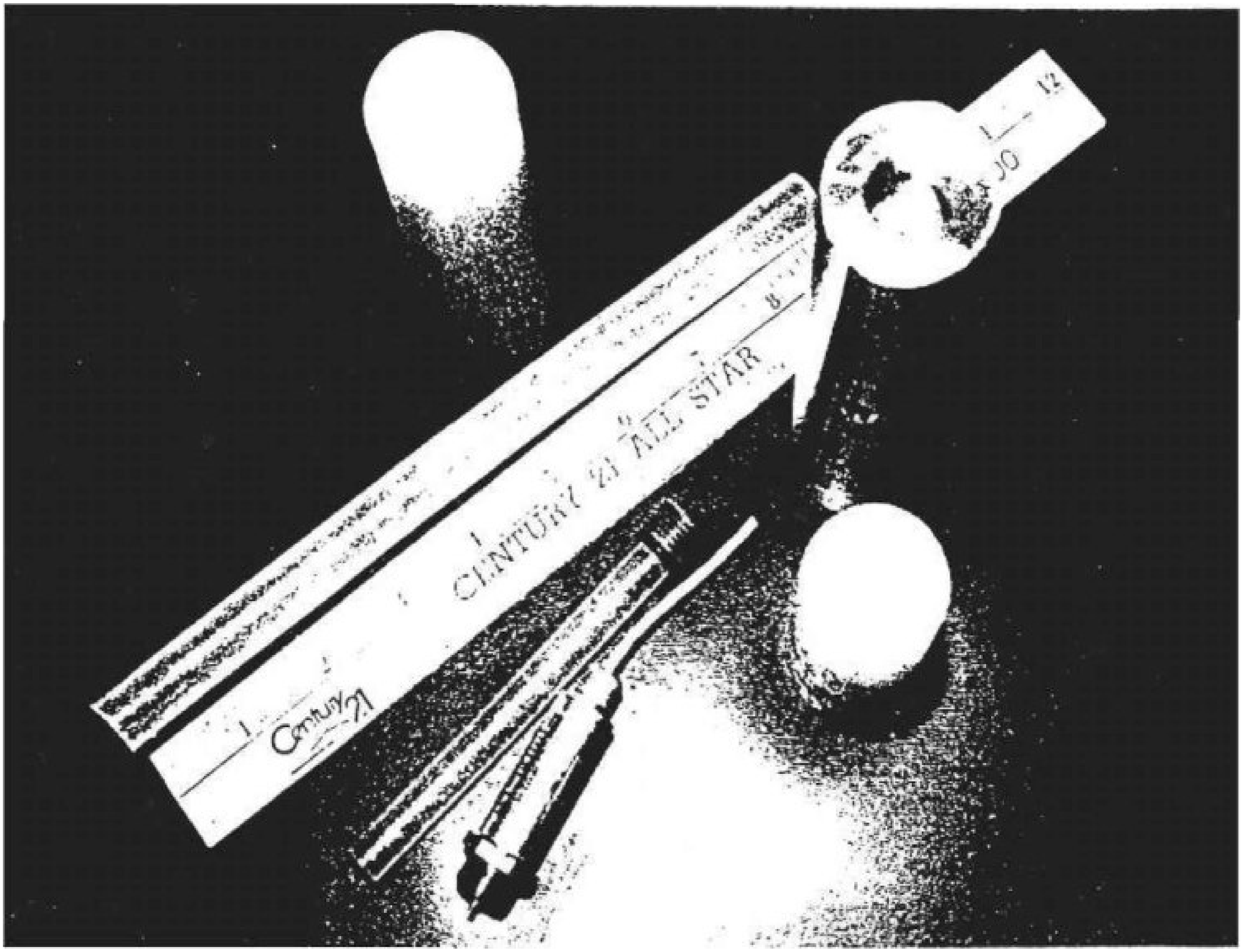
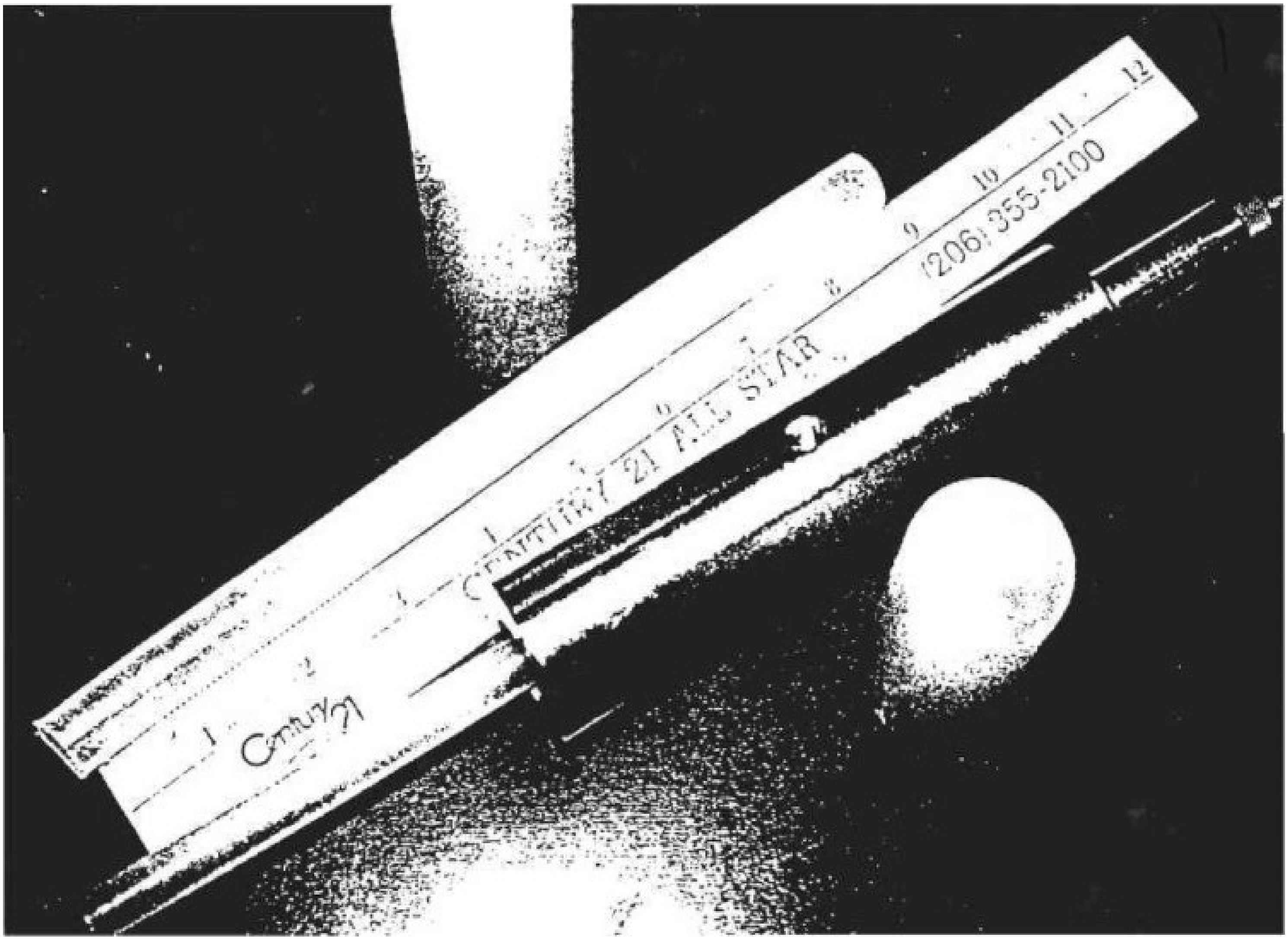


FIG. 10 – MICROWAVE CAVITY ATTACHMENT COLUMN
(DISASSEMBLED)



Four objects shown: A ruler and an unknown strip of material. Upper right: Aluminum cylinder (see Fig. 3) standing on end. Closest to ruler: Attachment at the base of the column shown in Fig. 3. Next to attachment: Unknown. The two white "golf ball" objects are unknown.

FIG. 11 – MICROWAVE CAVITY ATTACHMENT COLUMN
(ASSEMBLED)



Wave guide: The three parts shown in Figs. 3 and 10 are shown assembled here.

FIG. 12 – MICROWAVE EPR UNIT WITH MICROWAVE CAVITY, TEST SAMPLE HOUSING, AND TRANSDUCER

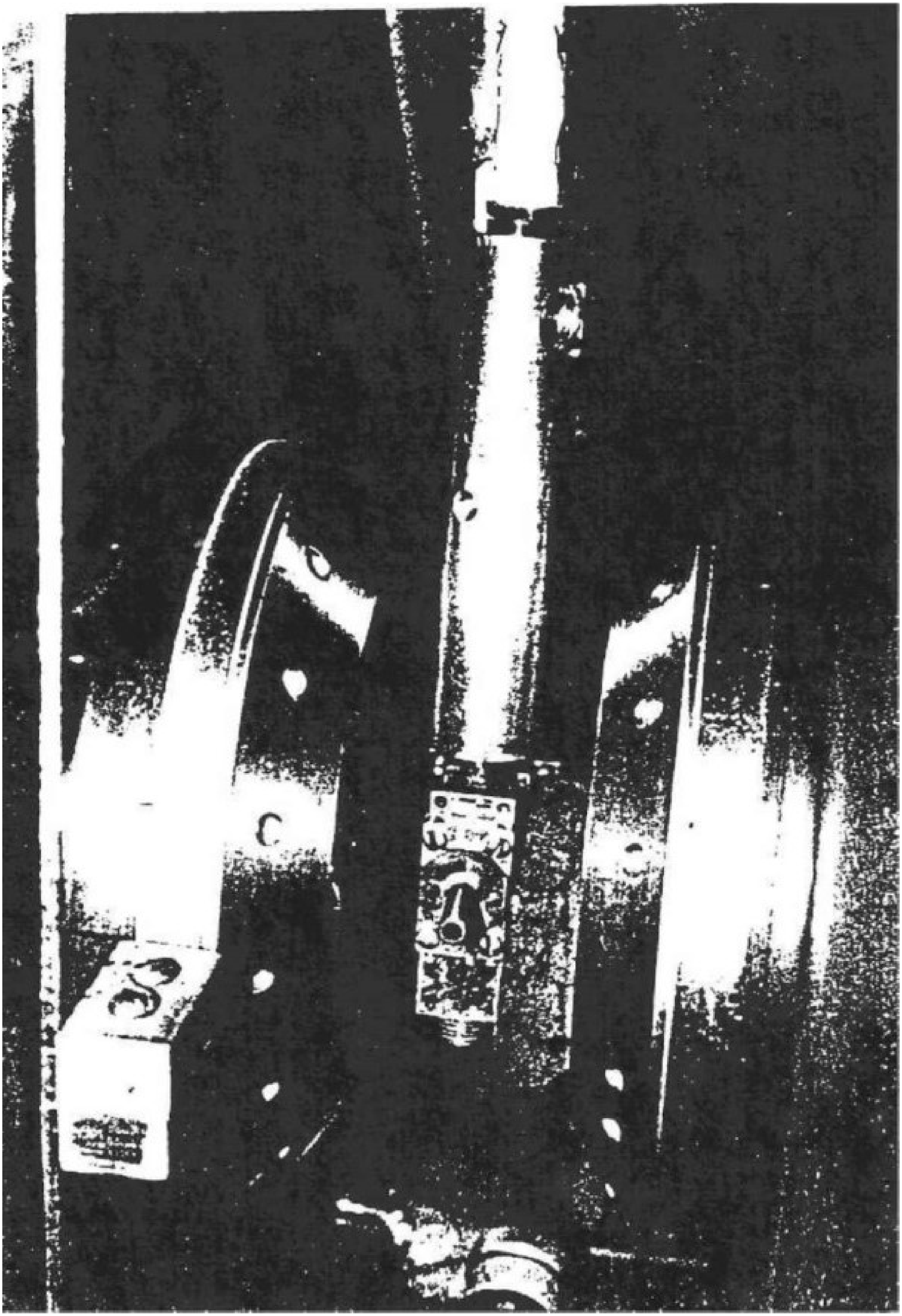
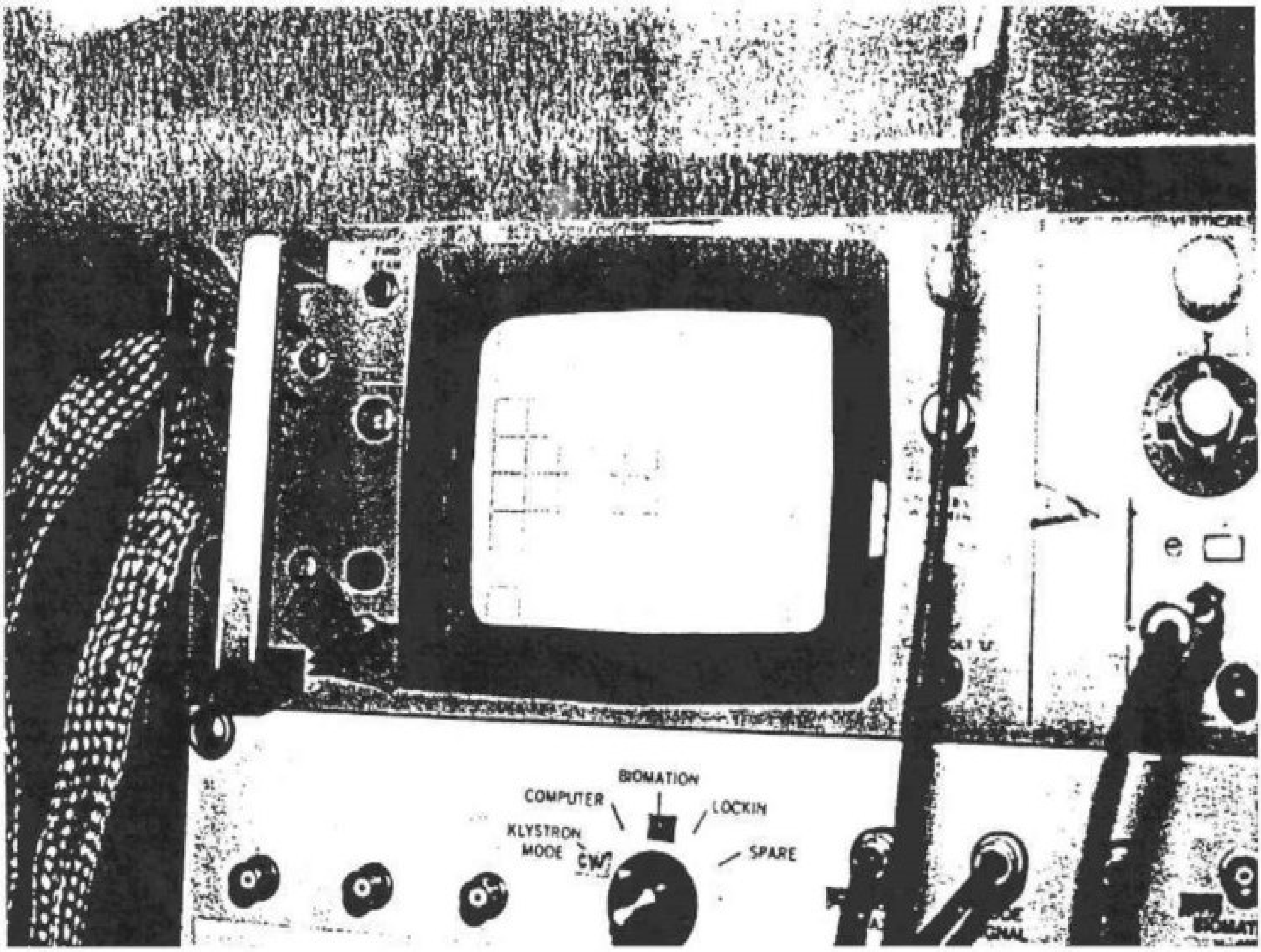


FIG. 13 – CALIBRATION/TUNING OSCILLOSCOPE



PART IX

Postscripts

She that is Queen of Tunis; she that dwells
Ten leagues beyond man's life; she that from Naples
Can have no note, unless the sun were post—
The Man i' th' Moon's too slow — till new-born chins
Be rough and razorable; she that from whom
We all were sea-swallow 'd, though some cast again
And by that destiny to perform an act
Whereof what's past is prologue; what to come,
In yours and my discharge.

— Shakespeare, *The Tempest*

EPILOGUE

THE FIRST TIME I ever set foot inside a casino, I was 23 years old, and it was in the name of a noble cause: *paying the rent*. What does this have to do with building a flying saucer and saving the planet? Maybe nothing, maybe everything—you decide.

As I discovered when I came home to the Bay Area from college in 1973, employment opportunities for writers were few, so I went to work for a small newspaper, writing five-hundred-word puff pieces about local businesses. My wages—$2.50 an hour, as I recall—barely covered the cost of renting a room in a house in Menlo Park. Spending five bucks on a movie required careful deliberation. So *money*, or the lack thereof, was always on my mind. The career path of a dot-com billionaire might have intrigued me, had I known about it, but in 1973 the word “dot-com” did not even exist.

So when I ran across a book called *Beat the Dealer* by Edwin O. Thorp, an MIT math professor, I was intrigued by its seductive message: *Blackjack is a game of skill, and you can beat it*. All you had to do, said Thorp, was learn “basic strategy” and count cards, and as surely as day follows night, the chips would rain down like manna from heaven. Ha! There it was—the solution to all my problems!

Inspired by Thorp, I got a deck of cards and a stopwatch and began counting down the deck on the kitchen table, faster and faster with each passing day. In a week or two, I figured I was ready for the big time, so one Friday after work I grabbed a Greyhound shuttle for Lake Tahoe. Five hours later, I stepped down the ramp at South Shore, head full of zeroes and ones, ready to storm the barricades. They’d never know what hit them, and that was for sure.

When I walked into Caesar’s Palace that chilly night, it was the first time I’d ever been inside of a casino. Nothing quite prepared me for the barrage of dazzling lights and sounds, not to mention the smell of money and excitement. It was intoxicating, but it made me wary: My “bankroll” consisted of three twenty-dollar bills, roughly thirty hours’ wages after taxes, which might last a couple of hours in the dollar-minimum, single-deck games that were still being offered in those days, or a few minutes in a five-dollar game, if the cards ran against me. But with slot machines ringing and wheels of fortune spinning and clacking on both sides of the long aisle leading toward the blackjack tables—not to mention the lure of free drinks to be had just for sitting down at a slot machine—I realized how easy it would be to blow my entire bankroll before I ever laid eyes on the green felt of a blackjack table.

As if on cue, a frenzied riot of lights and bells and sirens erupted nearby. Thinking perhaps a fire alarm had gone off, I asked a floorman what had happened. “Someone just hit a slot for seventeen grand,” he said, with a bemused grin.

The source of his amusement was a middle-aged woman standing by the one-armed bandit at the epicenter of the eruption, laughing hysterically and wobbling on weak knees under the congratulatory hugs and kisses of her comrades. I couldn’t help but think that in a fraction of a second, she had won the equivalent of three *years’* wages at my pitiful excuse for a job, and she’d done it, not by skillfully counting cards, but simply by pulling a lever on the right machine at the right time.

The divorce between money and labor was something new and strange to me, and the deeper I wandered into the casino, the more it gripped me in its spell. Aware that I was being drawn in, I steeled myself against temptation. Finally I came to the blackjack tables. They were mobbed, as one would expect on a Friday night. As I walked by, peeking over the players’ shoulders, I wondered how long it would take to win $17,000 at $1 blackjack—more than a few seconds, I surmised.

At the end of the row of tables, a gallery of slot machines beckoned from a deep pit at the east end of the casino. Temptation called. I passed the last blackjack table and kept on walking.

The principal form of life in the pit was electromechanical, a thousand gaping little slot mouths eager to swallow down your dollars, luring you in with bells and jingles and promises of instant riches. Human beings were in short supply. At the center of it all was a carousel of slots with an enormous neon placard flashing above it: “Progressive Jackpot! $750,000!” it beamed, as the numbers kept ticking up, up, *up*. It was a networked slot, one of the first ever deployed in Nevada, and a torrent of dollars was funneling in from casinos all over Las Vegas, Reno, and South Shore. By the way, $750,000 in 1973 dollars would be $4,068,462.84 in 2016 dollars. It sounded like a fortune, and it was.

Unlike the crowded blackjack tables, the carousel of slots was vacant except for one sallow, droopy-eyed gambler sitting on a stool and robotically pumping dollar coins into the slots of two side-by-side slot machines while smoke trailed from a cigarette dangling from the corner of his mouth. Over and over, he plucked a fistful of silver dollars from a bucket between the two machines, slid them methodically into the slots and then pulled the levers one after the other, letting the weight of his arm do the work. The mechanical reels spun to the tune of a merry jingle and quickly fell into place: *Chunk, chunk, chunk, chunk*. Then the hope faded from his eyes and he began all over again.

I knew the odds were millions-to-one against me, but how could I come all the way to Lake Tahoe without taking a chance on a $750,000 jackpot? All I had to do was draw the line at a reasonable investment. I was studying one of the slots when out of nowhere, a shapely chip girl dressed like a Roman goddess wheeled her cart to my side. “You want to play?” she smiled with a sparkle in her eye.

“Yeah,” I said, and handed her a $20 bill in appreciation of her innuendo. She handed me a stack of silver dollars and rolled her cart away. As I watched her go, I thought maybe I should have tipped her. *Something about bad luck? Oh well*.

Wary of going broke, I budgeted all of $12 for the great slot-machine experiment. If the gods were going to smile on me, they were going to smile, and it didn’t matter whether I pumped twelve bucks into the machine or twelve hundred.

On the first pull, I risked the maximum, $3. The reels fell into place one-by-one in a chaotic jumble of brightly colored fruit and “lucky 7s.” Not a single jackpot medallion showed up—not much fun for three bucks, almost the price of a movie ticket. I could see the future, and it looked sadder by $12.

I did it again. Three bucks and nothing in return. I decided to make the remaining six bucks of my “slot machine bankroll” last by doling it out in two-dollar bets. After all, the machine didn’t say anything about disqualifying myself for the jackpot by betting less than the maximum. I dropped two coins in the slot and pulled. *Chunk, chunk, chunk, chunk*. Nada.

I did it again. And again, nothing. Ten bucks gone in less than a minute. I slipped my “last” two coins in the slot while complimenting myself on getting the most out of my thrifty $12 budget.

Then I pulled the lever.

The first reel spun and quickly stopped: *Jackpot!*

The second reel clunked into place: *Jackpot!*

The third reel fell: *Jackpot!*

The fourth reel spun and spun and spun for what seemed like an eternity and then it abruptly stopped exactly where I always knew it was destined to stop: *Jackpot!*

Alarm bells went off in my head! Miracle! I had won $750,000! Visions of calling in rich on Monday were dancing in my head when I noticed something peculiar: *nothing happened*—no bells, no sirens, no flashing lights, no alarms—just silence, stone-cold silence.

I saw a floor man with a mustache standing nearby, contemplating the horizon with his hands folded in front of his sport jacket, so I called him over.

“Look, I think I hit the jackpot, but nothing happened,” I said.

“Hm, yeah, sure looks like it,” he said, shrugging his shoulders. He seemed genuinely perplexed. Then he turned and said, “How many coins did you say you put in?”

My heart sank. There it was—*the catch*. "Two," I said.

"Ah, that's it. See, the jackpot medallions are on line *three*. With two coins, you didn't buy line three, so...sorry 'bout that."

I nodded, and he laughed as he walked off. So did I. What did I care, anyway? I was twenty-three. There'd be other jackpots, and I was sure to...

That's when I heard a voice behind me. It was the emaciated slot-machine addict. I turned. He was slouched on his stool, lighting a cigarette, looking for all the world like the hookah-smoking caterpillar from *Alice in Wonderland*. I will never forget what he said in flat, clinical tones:

"For want of a dollar, you just lost a life-changing fortune."

Ominous words, but correct. By exercising an abundance of caution, I had dealt myself out of a lifetime dream. At the conclusion of this oddly literary phrase, the slot-machine philosopher pocketed the lighter, took a drag on his cigarette, dropped his elbow and yanked the lever as he exhaled. He wasn't interested in my reaction. His eyes fixated on the reels as they spun. It was as if I wasn't there.

"Guess you're right," I said. He said nothing. Affecting an air of nonchalance, I left, jogging up the steps toward the blackjack tables. *Just another tale to tell when I get home, that's all. Who cares? Things like that must happen every day in Tahoe*.

But that wasn't the end; it was the *beginning*. Little did I know, but the jaded gambler had just pronounced the Curse of the Slot Machine on me, and it was to haunt me forever. For in time it became clear that "For want of a dollar, the *whole world* was lost."

If I hadn't been so bloody cheap, if I'd had the guts to invest *one more dollar*, my whole life would have changed. More than that, I would have had the wherewithal to finance my father's experiment as soon as he figured out what needed to be done, which was roughly three years later, in 1976. *One more dollar* and he would have had a device to show the world. *One more dollar* in the coin slot, and antigravity would have gone mainstream in the late 1970s, and *we*—you and I—would be living in an unimaginably different world today instead of boiling slowly in a hydrocarbon hell. *One more dollar*, and my father would have seen his dream realized within his lifetime.

Time went by, and nothing like that moment in Tahoe ever came again. In the 1980s, I entered another casino: Silicon Valley. Half my stock-option dreams were vested in retiring early and studying music. The other ninety percent were vested in ridding myself of the Curse of the Slot Machine. (Yes, I can do math.) Twenty years and six failed startups later, I emerged with nothing. And through it all, I could see the pale face of the slot-machine addict pronouncing the Curse and pulling the lever. The Curse mocked me daily, kept me awake at night, and grew ever more painful with each new failure to find backing for my father's technology. Every time some false hope lifted me up, the Curse took hold and crushed it.

Then, in 2012, my dad died, leaving his lifetime quest unfulfilled, ending forever any chance I might have had to redeem myself. At least, to find the kind of redemption I had envisioned.

For want of a dollar. If there was any consolation after 2012, it was only that there was still a planet full of people to be saved. Because of karmic waves emanating from 1973 at Lake Tahoe, I found myself working incessantly for three more years, from 2012 through 2015, knocking on all the same doors that had been knocked on before. This time, however, no-one would even answer. If someone had peered suspiciously through a half-open curtain, I would have regarded it as a moral victory. But it was like trying to give away lifeboats on the deck of the Titanic, with the doomed passengers slamming their cabin doors in my face one after another after another.

Finally came the inspiration to write *How to Build a Flying Saucer*—a humiliating effort to give away everything for nothing. Completing the monumental task consumed yet another year, and in the end, I suspected, no-one would believe it anyway—not the theory, not the technology, and especially not the proof—just as no-one believed the Time Traveler in H. G. Wells' *The Time Machine:*

"*I think that at that time none of us quite believed in the Time Machine,"* the Narrator said.

If I did have a time machine, I would go back to 1973 and show up at that slot machine in the pit just as I was about to pull that lever (I doubt that I would have recognized myself) and with three words, I might well have changed the course of history:

" *One more dollar*."

The question is, would I have heeded my own advice?

Now I find myself stuck in the present, the dreary year of 2016, the hottest on record since record-keeping began, sitting at my kitchen table at two a.m., a sixty-six-year-old ex-surfer dude, full of regrets. And while I ponder weak and weary, it seems I'm like the Time Traveler, fresh from a journey to the near future—2216, say—when, for want of a dollar in 1973, *the whole world was lost*. We stand in front of the slot machine of Fate together, and just before *you* put *two* dollars in the slot, I make a final plea:

"One more dollar."

What do you do?

The Time Traveler surveyed his Victorian world, knowing it stood on the eve of a series of global wars fought with ever more effective weapons of mass destruction, and he "saw in the growing pile of civilization only a foolish heaping that must inevitably fall back upon and destroy its makers in the end." He decided *not* to hang around. Instead, he gathered a backpack and a small camera, climbed into his time machine and vanished back to the future, to the year 802,701, leaving only "two strange white flowers" behind, two flowers he'd brought back from that Garden of Eden, "—shriveled now, and brown and flat and brittle—to witness that even when mind and strength had gone, gratitude and a mutual tenderness live on in the heart of man."

Not an option here. We are *all* travelers on a common Time Train, heading down the track toward a rickety trestle over a bottomless gorge. That is the grim reality. But our story is not without hope: Against all odds, we *may* yet escape, and while the proposed method may sound like something out of an H. G. Wells novel, it has a good chance of being real—far better than a slot-machine jackpot or a time machine. My father, the scientific method, and the 1994 experiment saw to that.

So now you know why I wrote this book—the clandestine purpose, the secret *agenda*, as it were: *It was to rid myself of the Curse of the Slot Machine*. Cleverly, while entertaining you with a preposterous tale of particle physics and UFOs, I have contrived to pass it along to *you—if* you have the wherewithal to do something about it, or if you know someone who does and can give them this book. If you remain doubtful, if you're about to close the covers and go, I have a final word of advice:

Don't be me!

Don't be afraid to risk a dollar and then regret it for the rest of your life. History is made by the risk takers. The rest of us are just along for the ride, like children on a carousel. Sitting on the pony, oblivious, is a safe place to be, but "safe" is no longer safe. The carousel just hasn't crashed yet.

So are you *Filby*, the "argumentative man with red hair," or are you the Time Traveler?

> '*Oh* this,' *began Filby, 'is all—'*
>
> '*Why not?' said the Time Traveler*.
>
> '*It's against* reason,*' said Filby*.
>
> '*What reason?' said the Time Traveler*.

APPENDICES

Appendix A

ERRATA FROM THE 1981 PAPER

INCORPORATE THE FOLLOWING CORRECTIONS into “Anti-Gravity with Present Technology: Implementation and Theoretical Foundation,” AIAA/SAE/ASME, 17th Joint Propulsion Conference, 27029 July 1981, Colorado Springs, Colorado. To download, go to Google and search on the terms “Alzofon, anti-gravity, AIAA”. The top link will take you directly to the relevant page on the AIAA website. Before you download the PDF, you will have to create an AIAA account and password, which is easy to do. The fee for the download as of this writing is $25.00.

1. Page 1, column 1, paragraph 3, sentence 2

Currently reads:

> “These features, which concern the annihilation and creation of matter-energy...”

Should read as follows. Note that the word “energy” changes to “radiation,” and a new sentence has been added, beginning “It is emphasized.” Italic emphasis by F.A.:

> These features, which concern the annihilation and creation of matter-radiation, are shared by all subatomic processes and have been successfully been used in the explanation of the Lamb-Retherford effect, i.e., by the quantum electrodynamics. It is emphasized here, and in the following, creation and annihilation of *both* photons and particles (i.e. radiation *and* matter) are included. The model proposed...

2. Page 3, column 1, paragraph 1, sentence 3

Should read as follows, with an added footnote attached to the word “stability,” which directs the reader to *Appendix B* of the paper (and not *Appendix B* of this book):

> To remain stable, in the sense in which we have defined stability,* an alteration in the mass-energy distribution must take place, according to Le Châtelier’s principle, which will compress the matter-energy into a smaller volume with the smaller diameter given above and corresponding to the new stability configuration.

*See *Appendix B.*

Appendix B, page 31 of the paper, begins with the sentence, “By means of Rayleigh’s method, it is possible to gain further insight into the role played by random phase shifts in generating that property of matter-radiation known as inertia.”

3. Page 16, column 2, paragraph 2, line 4

Insert equation after “it is clear that one should obtain, for example...” and add harpoon over *r*, as shown below:

$<V(\vec{r},t;\vec{r}_0,t_0)>_0 = V(\vec{r},t)$ where $V(\vec{r},t)$ denotes a solution of Maxwell’s equation.

4. Page 16, column 2, paragraph 3, line 5

Add harpoons over the two *r* symbols, as shown here: $\vec{r},\ t,\ \vec{r}_0,$ and t_0

5. Page 19, column 2, next-to-last paragraph

Equation 6.42 is missing. The missing equation is shown below *(“k”* denotes “kappa”):

$$e^{i\vec{k}\cdot\vec{r}} \quad e^{ixs_0\cos\alpha} \tag{6.42}$$

Appendix B

A NOTEBOOK FRAGMENT

EDITOR'S NOTE

The following notebook fragment was probably written between 1989 and 1994, as it briefly compares the UFT with Dr. Hal Puthoff's theory of the origin of gravitation (1989),[75].and the 1994 experiment isn't mentioned Puthoff and my dad were colleagues at SRI in the 1950s and remained in touch on a friendly basis through the 1990s. The topic is the analogy between cryogenics and reduction of the gravitational field by dynamic nuclear orientation. This topic is discussed elsewhere, so it didn't bear inclusion in the main body of the text, but the treatment is somewhat different here, so it seemed worthy of inclusion in an appendix.

INTRODUCTION

It is the purpose of this exposition to compare the cooling of a paramagnetic specimen by adiabatic demagnetization, and the cooling of the gravitational field by dynamic nuclear orientation. These will be compared in detail, with numerical estimates of the quantities introduced, so as to clarify the process of reduction of the gravitational field.

COOLING OF A PARAMAGNETIC SALT BY ADIABATIC DEMAGNETIZATION

1. A constant magnetic field is applied to the specimen, which may have been previously cooled by a convenient means. The field aligns the elementary magnetic dipoles of the specimen, which work on the rest of the specimen, raising its temperature, if applied quickly enough that the heat generated cannot be conducted away quickly enough.

2. The specimen then comes to thermal equilibrium with its surroundings.

3. The magnetic field is removed suddenly, i.e. quickly in comparison with the molecular processes which conduct heat to the specimen, i.e. in a time interval small compared with the time required for a molecule of the environment to traverse one mean free path. The elementary dipoles of the specimen are left oriented.

4. The thermal collisions of the surroundings perturb the orientation of the oriented dipoles, causing them to lose their orientation, and, in the process, losing some of their own energy.

The loss of energy described in Step 4 above is worth discussing in more detail: The surroundings, in equilibrium, is composed of molecules colliding with one another in a chaotic manner with orientations distributed in a random manner. However, when they collide with the oriented molecules of the specimen, some of the orientation of the specimen is communicated to the surroundings, thus removing some of the degrees of freedom available to the surrounding's molecules which have collided with the molecules of the specimen. The rest of the molecules of the surroundings then collide with the oriented molecules and, with the speed of sound, the loss of degrees of freedom is communicated to the rest of the surroundings. This lowers the temperature of the surroundings. This loss of temperature is shared with the specimen.

DYNAMIC NUCLEAR ORIENTATION

In reducing the force of gravitation by dynamic nuclear orientation, the procedure is analogous to the above:

1. A constant magnetic field is applied to the specimen. This field causes the electrons in the specimen to precess with the Larmor frequency (approximately) about the direction of the field. The electrons should be in penetrating orbits so that the precession can be carried to the nuclei of the atoms.

2. A microwave field of the same frequency as that of the precession is applied to the electrons, and this causes the electrons to flip over, and, in turn, causing the nuclei to turn over. Thus the nuclei become oriented.

3. The magnetic moments of the nuclei and electrons are conceived as consisting of two parts:

   a) A hard core of dense, circulating electric currents, essentially responsible for the usually-measured values of the magnetic moments.

   b) A cloud of electric charges due to the virtual processes, which are not as tightly bound to the hard core as the currents making *up* the core.

4. The orientation of the nuclei and electrons induces orientation of the virtual charges as well as the hard core. Since most of the mass of the atoms is due to the nuclei, and virtual processes are responsible for the existence of inertial mass, we can expect there to be more virtual processes near the nuclei than near the electrons. In general, of the mass *m*, the fraction $\sqrt{G}m$ is effective in producing the gravitational field. Since the field is produced by the overlap of the virtual particle/radiation field attributable to and due to each element of inertial mass, we must attribute most of the effective mass $G\,m$ to the overlapping field. And since about 80% of the virtual processes in quantum electrodynamics is due to the radiation field, this quantity is approximately equal to the strength of the radiation processes associated with the virtual processes causing the gravitational field.

5. Since the overlap of gravitational fields in space does not alter these fields separately, we must conclude that the virtual, mostly-radiation field generating gravitation must interact with the elementary particle or nuclear masses themselves. The fact that the same fractional amount of this interacting mass: G M, is effective in the force law, is not surprising in light of Puthoff's theory of the origin of the gravitational field (H. E. Puthoff, "Gravity as a Zero-Point Fluctuation Force," *Phys. Rev. A 39* [1989] 2333). This theory is equivalent to the Alzofon theory, except that the approximation is made that only fluctuating dipoles interact through the zero-point electromagnetic field. In terms of the present discussion, we imagine fluctuating dipole moments in a given amount of inertial mass *m*, generating a fluctuating electromagnetic field, and interacting with the induced fluctuating dipole moments of the mass *M*. The effect of the fluctuations has been averaged out so that the dipole moment does not appear in explicit form. However, we imagine the dipole moment to consist, essentially, of electron-positron pairs, since, after photons, these take the minimum amount of energy to be created. The distance between these parts of the dipole has been averaged out with the rest of the form factors. Thus, we can expect the total number of particles (or charges) to be

$$\frac{2\sqrt{G}\,m}{e}$$

for a mass m. The magnitude of 2 *G/e* is 1.07 x 10^6 for *m* in *gm*.

[*The fragment ends here*]

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[75] H. E. Puthoff, "Gravity as a Zero-Point Fluctuation Force," *Phys. Rev. A 39* [1989] 2333

Appendix C

PUBLICATIONS ON GRAVITATION

THE FOLLOWING list includes two reviews of Alzofon's theory and his research on gravitation. His work on gravitation was mentioned briefly in *OMNI* and *Science Digest*, probably in the 1980s, but exact references are unavailable.

1a. "The Origin of the Gravitational Field," *Advances in the Astronautical Sciences*, Vol. V, pp. 309-319, Plenum Press, New York, 1960. *[Ed note: Incorporate errata from* Appendix A *above.]*

This is the paper that drew the attention of Air Force analyst Dr. Maurice Garbell, who was conducting a worldwide survey of gravitation research (see Chapter 15, p. 93). In the report, Garbell stated that the UFT suggested a means of controlling gravitation. In a conversation at a restaurant in Palo Alto, he said it was the only theory of gravitation he'd found that had a prayer of becoming an applied technology, but at the same time, he predicted that academia would never investigate it. His prediction has held true for 56 years. Garbell's paper is significant enough to cite below.

1b. M.A. Garbell, "Soviet Research on Gravitation, An Analysis of Published Literature," sponsored by Science and Technology Section, Air Information Division, AID Report 60-61, 379 pages. Distributed by U.S. Department of Commerce, Business and Defense Services Administration, Office of Technical Services, Washington, D.C., October 1960. *Ed note: Available online.*

2. "Anti-Gravity With Present Technology: Implementation and Theoretical Foundation," AIAA/SAE/ASME, 17th Joint Propulsion Conference, 27029 July 1981, Colorado Springs, Colorado

In order to download a PDF, go to Google and search on the terms "Alzofon, anti-gravity, AIAA". The top link will take you directly to the relevant page on the AIAA website. Before you download the paper, you will have to create an AIAA account and password, which is easy to do. As of this writing, the fee for the download is $25.00. Be sure to incorporate the errata in Appendix A*, p. 341.*

3. "A UFO Propulsion Model," MUFON Symposium Proceedings, *MUFON Journal*, No. 170,

April 1982

4. “The Unity of Nature and the Search for a Unified Field Theory,” *Physics Essays, volume 6, number* 4 (1993) 599-608

This paper complements the theoretical foundation in Ref. 2 above. My father considered it his most important paper on the UFT. Of particular interest is Sec. 7, Model of Gravitation and Alteration of the Gravitational Force

5. Yost, Charles; “Review of the Work of Dr. Frederick E. Alzofon,” *Electric Spacecraft Journal,* compiled and reviewed by Editor Charles Yost, Issue 13, 1994

The late Charles Yost conducted a telephone interview with my father and wrote this comprehensive statement of the theory and technology. My dad later said that while it was a good introduction, particularly for lay readers, it was inaccurate on several points. The article mentions the success of the 1994 experiments. Unfortunately, copies of the Journal are extremely difficult to find.

6. Fox, Hal, Editorial: “New Science Teaches, Soon Engineers Build,” *New Energy News – Monthly Newsletter of the Institute for New Energy*, Vol. 2, No. 7, ISSN 1075-0045, Nov. 1994. PDF available online at http://newenergytimes.com/v2/archives/fic/N/N199411s.PDF as of this writing.

Fox reviews the unified field theory in one paragraph, and in the final two sentences says, without equivocation, that my father’s experiments successfully substantiated the theory. It is unknown where Fox got his information, since no source was cited, although it is possible it was Yost (5 above), who also alluded to successful experiments. At any rate, the cat was out of the bag at this point, and no-one seems to have noticed.

7. “Light Signals, the Special Theory of Relativity and Reality,” *Physics Essays, 14* (2001) 144-148

8. “UFOs and Crop Circles, Gravitational Field Common to Both,” *MUFON Journal*, No. 435, July 2004: https://issuu.com/disclosureproject/docs/mufon_ufo_journal_-_2004_7._july, or search on “Alzofon MUFON Disclosure Project” and follow the top link.

9. “A ‘new and simple idea,’ dark matter-energy and the crisis in physical theory”: This paper is included here. See *Chapter 36*, page 269.

In order to download original, go to http://vixra.org/pdf/1007.0008v1.pdf

This was my father’s final paper on the UFT, written when he was ninety years old. The paper was turned down by *Nature* and *Physical Review*, which he felt was due to the same

old prejudices that dated back to the 1940s. While there is factual evidence for this, this is not the proper venue to elaborate. He told me he didn't have the stomach for another time-consuming battle with editors and referees, so he filed the paper online at ViXra.org in 2009 in order to establish a copyright on the text and ideas. No permissions were required to reprint it here.

The following is a copy-and-paste of text from the ViXra.org website:

> *ViXra. org is an e-print archive set up as an alternative to the popular arXiv. org service owned by Cornell University. It has been founded by scientists who find they are unable to submit their articles to arXiv. org because of Cornell University's policy of endorsements and moderation designed to filter out e-prints that they consider inappropriate. ViXra is an open repository for new scientific articles. It does not endorse e-prints accepted on its website, neither does it review them against criteria such as correctness or author's credentials.*

Appendix D

PUBLICATIONS BY F. ALZOFON

1. "Relativistic Neutron-Proton Scattering in the Born Approximation," *Physical Review*, 75 (1949) 1773

2. "The Probability of Continuous Tracking in the Presence of Random Noise," *Proc. National Electronics Conf*. 14 (1958) 519

3. "Theoretical and Experimental Investigation of Heat Conduction in Air, Including the Effects of Oxygen Dissociation," NASA Technical Report R-27

4. "An Exchange Transfusion Formula," *AMA Journal of Diseases of Children, 98* (1959) 694

5. "The Origin of the Gravitational Field," *Advances in the Astronautical Sciences*, Vol. V, pp. 309-319, Plenum Press, New York, 1960

6. "The Effect of Tubing Dead Space in Exchange Transfusions," AMA Journal of Diseases of Children, *102* (1961) 194

7. "Applications of Infrared Technology in Nondestructive Testing," *Proc. Missiles and Rockets Sym.*, USNAD, Concord, CA, 18-21 April 1961, pp. 247-251, Fontes Abbey Press, 777 W. Grand Avenue, Oakland, CA

8. "Retardation and Diffraction Aspects of the Conduction of Heat in Solids," *American Journal of Physics, 30 (1962)*

9. "Infrared Nondestructive Testing of Glass Filament Wound Rocket Motor Cases," ASTM Fourth Pacific Area National Meeting, Proc. 1962

10. "Variational Approach to the Calculation of Charge Exchange Cross Sections for Adiabatic Collisions." NASA TN D-1654, May 1963

11. "Factors Influencing the Detection of Flaws in Glass Filament Wound Rocket Motor Cases by Infrared Scanning," Second ICPRG Symposium on the Nondestructive Inspection of Solid Propellant Rocket Motors, Chemical Propellant Information Agency, Applied

Physics Laboratory, Johns Hopkins University, 1963, Proc.

12. "An Infrared Nondestructive Testing System for Rocket Motors," *Materials Evaluation, 23* (1965) 537

13. "Relative Contributions of Emissivity and Thermal Conductivity in Infrared Nondestructive Testing," Transactions of the Infrared Sessions, Society for Nondestructive Testing, Spring Meeting, 22-26 February 1965, Los Angeles, CA, Proc.

14. "Optics and Infrared Nondestructive Testing," Symposium on Physics and Nondestructive Testing, 28-30 September 1965, Dayton, Ohio, Proc.

15. "Infrared Detection of Flaws in Adhesive-Bonded Metallic Honeycomb," Society for Nondestructive Testing, 1966 Spring Convention, 7-10 March 1966, Los Angeles, CA, Proc.

16. "Infrared Evaluation of Microweld Quality," *Materials Evaluation, 25* (1967) 183

17. *Multiple-Valued Functions in Three-Dimensional Space and Sommerfeld's Method*, published under the auspices of the Houston Aerospace Division, Lockheed Electronics Company, 1970. (Book)

18. "The Optical Environment of Rocket Platforms," Proc. Infrared Information Symposium, *14* (1970) 131 (This paper was classified CONFIDENTIAL when published, but has since been declassified)

19. Many reports on infrared technology have been written but are not cited here. Some of their titles are quoted in the *Bibliography of Practical Applications of Infrared Techniques*, by Riccardo Vanzette, John Wiley and Sons, New York, 1972

20. "Remote Sensing of Thermal Subsurface Terrain Properties," Technical Papers of the American Society of Photogrammetry, 47th Annual Meeting, Washington, D.C., 22-27 February 1981, pp. 335-341

21. "Anti-Gravity With Present Technology: Implementation and Theoretical Foundation," AIAA/SAE/ASME, 17th Joint Propulsion Conference, 27029 July 1981, Colorado Springs, Colorado (*see p. 348 for download information)*

22. "Comparison of the Day and Night Signatures of a Strategic Target" (U), SECRET, Infrared Information Symposium, 14 February 1985, Orlando, Florida

23. "Exact Solutions in Closed Form for Fresnel Diffraction by a Semi-Infinite Plane and a Circular Disc," Proc. SPIE, Current Developments in Optical Engineering and Diffraction Phenomena, *679* (1986) 112

24. “Diffraction of a Plane Electromagnetic Wave by a Flat Conducting Strip and by a Circular Conducting Channel,” Proc. SPIE, Current Developments in Optical Engineering and Diffraction Phenomena, 679(1986) 119

25. “The Optics of Heat Conduction in Solids,” Proc. SPIE, Technical Symposium Southeast, Thermosense IX, *780* (1987) 215

26. “Scattering of Electromagnetic Radiation by a Hexagonal Ice Crystal,” Proc. 14th Congress of the International Commission for Optics, 24-28 August 1987, Quebec, Canada, pp. 405-406

27. “Radiation Scattering by Flakes of Arbitrary Shape,” Proc. SPIE Technical Symposium Southeast, 4-8 April, 1988, Orlando, Florida, 927 (1988) 10

28. “Radiation Scattering by Solids of Arbitrary Shape: A New Method of Solving Boundary Value Problems,” *Journal of Wave-Material Interaction, 3* (1988) 85

29. “Scattering of Traveling Temperature Waves by Small Inclusions in a Homogeneous Solid,” *Journal of Wave-Material Interaction, 3* (1988) 283

30. “Multiple-Valued Solutions of the Equations of Field Propagation: Sommerfeld’s Method, I, Introduction,” *Journal of Wave-Material Interaction*, 7(1992) 121

31. “Multiple-Valued Solutions of the Equations of Field Propagation: Sommerfeld’s Method, II, Static Fields,” *Journal of Wave-Material Interaction*, 7(1992) 127

32. “Multiple-Valued Solutions of the Equations of Field Propagation: Sommerfeld’s Method, III, Fraunhofer Diffraction,” *Journal of Wave Material Interaction, 8* (1993) 1

33. “Multiple-Valued Solutions of the Equations of Field Propagation: Sommerfeld’s Method, IV, Fresnel Diffraction,” *Journal of Wave-Material Interaction, 8* (1993) 89

34. “The Unity of Nature and the Search for a Unified Field Theory,” *Physics Essays, 6* (1993) 599-608

35. “Optical Analogues in a Dispersive Medium, I, The Physical Model and Geometrical Optics,” *Journal of Wave-Material Interaction, 8*(1993) 185-199

36. “Optical Analogues in a Dispersive Medium, II, Physical Optics and Anisotropic Mediums,” *Journal of Wave-Material Interaction, 8* (1993) 200-217

37. “Optical Analogues in a Dispersive Medium, I and II, have been reprinted in *Selected Papers on Temperature Sensing: Optical Methods*, Ed. R. D. Lucier, SPIE Milestone Series, Vol. MS 116, SPIE Optical Engineering Press, Bellingham, Washington, 1995

38. “Some Optical Concepts in the Analysis of Viscous Fluid Flow,” *Journal of Wave-Material Interaction, 11* (1996) 219-233

39. “The Transition to Turbulent Fluid Flow,” *Journal of Wave-Material Interaction, 11* (1996) 234-244

40. “Light Signals, the Special Theory of Relativity and Reality,” *Physics Essays, 14* (2001) 144-148

41. *Two Methods for the Exact Solution of Diffraction Problems*, SPIE Press, Bellingham, Washington, 2004. (Book)

42. “A ‘new and simple idea,’ dark matter-energy and the crisis in physical theory”: Final completed paper, unpublished, filed online in 2009 (age 90), at the following URL:

http://vixra.org/pdf/1007.0008v1.pdf

From 2010 to 2012, when he was 91 to 93 years old, my dad was working on a further extension of Sommerfeld's Method. After he died, circumstances allowed only two hours to sort through the reams of papers in his study, and I was unable to find any drafts of the new book.

Appendix E

MANHATTAN PROJECT AS METAPHOR

THE FOLLOWING NARRATIVE didn't seem appropriate for the main body of the book, but I am including it because it helps to explain some of the seemingly contradictory decisions my father made in regard to the technology.

Chapter 17 (p. 103) describes a 1960 meeting he had with an Air Force Colonel who headed the Foreign Technology division at NASA (then NACA) Ames Laboratory. During that meeting, the Colonel said that any program to develop an antigravity propulsion system "would be classified higher than the Manhattan Project." Both of my parents had first-hand knowledge of what this implied.

On the following page is a certificate awarded my mom by the War Department at the end of World War II for her service on the Manhattan Project. It came with a sad irony. While my mom would have done everything within her power to support the war effort and defeat fascism, she had no idea that she was participating in the construction of a bomb that would annihilate tens of thousands of human lives in a fraction of a second. If she had, I am certain she never would have participated at all. But nothing like the A-bomb had ever existed before in human history, and the secrecy surrounding the project ensured that no-one, outside of a few people at the top, such as J. Robert Oppenheimer, who my father had studied under at Cal, knew what they were doing on behalf of "the Manhattan District."

My mom's job was to sit in a room full of draftsmen at the University of Chicago, making mechanical drawings. For all she knew, she might have been drawing fossil fragments excavated from a mass dinosaur grave in Montana. But one day, something extraordinary and unexpected happened. She was sitting at her table when the door flew open and a team of workers in hazmat suits entered.

United States of America
WAR
DEPARTMENT
ARMY SERVICE FORCES ~ CORPS OF ENGINEERS
Manhattan District

This is to Certify that

NORMA X. XXXXX
University of Chicago

has participated in work essential to the production of the Atomic Bomb, thereby contributing to the successful conclusion of World War II. This certificate is awarded in appreciation of effective service.

6 August 1945

Henry L Stimson
Secretary of War

Washington, D. C.

Certificate from the War Department given to my mom at the close of World War II (maiden name concealed). The barely visible watermark says "Manhattan Project – A Bomb." The seal at the bottom says," United States of America War Office. "The signature, "Henry L. Stimson," Secretary of War, is in blue-black ink and appears to be an original.

The artists were ordered out of their seats. Then the crew pulled one of the drafting tables out of the way and went to work on the floor with jackhammers. She was sent home while the workers busied themselves about the room, taking Geiger counter readings.

The next day she returned to work as usual, only to find that the drafting table was gone, as well as the young man who had been seated behind it. In their place was a hole in the floor ten feet in diameter. It was a through-and-through hole, with a view of the room below. Everyone was sent back to their drafting tables to resume drawing. At the end of the day, she received a bottle of iodine tablets with instructions to take (as I recall) one a day for ten days.

Later, the story leaked: A pair of visiting bureaucrats had gotten into the room below without an escort, and one of them had decided to have a peek at "the rarest substance on earth." They opened the door of a safe and rolled out a lead container that held a pellet of refined plutonium. My mom specifically said a "pellet." Plutonium was later found to be "safer" when molded into a collar-shaped loop.

Unaware of the danger, they removed the lid from the container, reached inside with a pair of tongs, and lifted the plutonium out into the open air, bathing the room in lethal radiation. The incident had occurred directly beneath the hole in the floor. The penalty for gazing into the Gorgon's face was death, which came quickly in the form of radiation sickness for the two in the room below. For the draftsman sitting at the table above the plutonium canister, it took longer. He developed radiation sickness first, then testicular cancer, and he died within a few months.

This story appears to be apocryphal. Nothing could be discovered about it on Google, and I have never heard it reported in any other source. Only the cases of Harry Daghlian and Louis Slotin bear any similarity, and they are well-publicized. Because of the lack of corroboration, one must conclude that the incident was covered up or that my mother imagined the whole thing. Perhaps she imagined the certificate from the War Department, as well as the potassium iodide tablets I found in a brown bottle in her green WWII-era footlocker, too. Whatever the truth, the story became part of family lore.

Could it have happened? The toxicity of plutonium, it seems, is inversely proportional to its proximity to an employee of the nuclear industry, which by the way offers further confirmation of Sinclair's theorem (*see p. 18*). For example, Dr. Bernard Cohen, Director of the University of Pittsburgh's Scaife Nuclear Laboratory '65 – '78 told Ralph Nader that he (Cohen) would eat as much plutonium as Nader would eat caffeine, since he considered them equally dangerous. He also offered to inhale one thousand times as much plutonium as Nader said would be fatal. Professor Cohen never made good on either offer, blaming Nader for "not accepting his challenge." I can't think what might have prevented Dr. Cohen from eating or breathing plutonium on his own, except common sense and a modicum of terror. Plutonium is generally regarded as the most toxic substance known to science.

The question of how much radiation my mom received was never answered. Her boss told her that it had been minimal for everyone in the room except the young man seated directly above the open canister. But as the so-called "safe" level of radiation exposure was lowered steadily through the '50s, '60s, and '70s, the "Manhattan Project" incident cast a long shadow over my mom's peace of mind. Beginning in the late '60s, she developed three different forms of cancer in succession, one of which eventually caused her death at age 67. Her two elder sisters, neither of whom were exposed to radiation, did not develop cancer. One lived into her eighties, the other reached one hundred. Neither of my grandparents developed cancer.

My father did experimental work at the cyclotron at the Lawrence Berkeley National Laboratory at the same time as the Manhattan Project while he was a graduate student. Robert Oppenheimer was one of his professors at the beginning of the war. It's difficult to say how much radiation exposure he had, if any, though my uncle John Dorsey, who worked in the same area, received quite a bit. He was as bald as an Easter egg, and we used to joke that it had made all of his hair fall out, though I don't know if that was true. He died of heart failure at an advanced age and never suffered from cancer, as far as I know. Though my father died of melanoma, the radiation that caused it may have been "X-ray treatment for acne," a quack medical practice dating back to 1930s Detroit. He also had thyroid cancer, quite likely from the same source.

The Manhattan Project meant more than radiation exposure to my parents. It was symptomatic of the shift away from an open society toward the national security state, with all its clandestine machinations, lack of public accountability, paranoia, cover-ups, and bureaucratic satraps. There was a time when the United States was relatively free of these benefits of empire, and their lives straddled the transition.

Like most graduate students in physics at Cal in the early 1940s, my dad was not overly fond of J. Robert Oppenheimer. He said that Oppenheimer continually brooded on the knowledge that in spite of his brilliance, he lacked a gene for creativity and had contributed nothing of any importance in theoretical physics. The Manhattan Project, according to my dad, was his chance to finally "do something really big." Oppenheimer, according to my father, belonged to a class of academic scientists who were "exquisitely sensitive to the flow of power," and in the tradition of Eastern European societies, "were always concerned with who had whose boot on whose neck."

To my dad, the Manhattan Project and the Cold War mentality, however laudable their goals might have been, were a perfect reflection of Oppenheimer's personality. The Bomb exemplified the determination of the military to turn science toward destructive ends, and the secrecy and Machiavellian manipulations of Oppenheimer had nothing to do with the things that led my father into physics in the first place.

The Manhattan Project also exemplified the tendency for sociopathic personalities to rise to the top of bureaucratic organizations. Creativity seemed to be inversely proportional to the position of power such individuals occupied, and they viewed inventors and theoreticians as mere pawns to be moved around a chessboard. Inventors were a "pain in the ass" to empire builders, who discarded them as soon as their ideas were "proved out." This was a pattern my father saw repeated over and over in aerospace research as well. The problem for the empire builders was that "creative types" wanted to change things—in other words, they were "shit disturbers." They also had some annoyingly legitimate claim to a say-so over the fate of their inventions. Administrators wanted all that power for themselves.

The following story illustrates the latter point. In the 1960s, my dad's research in thermography at Lockheed led to the creation of IRNDT—Infrared Nondestructive Testing—which was more accurate than X-ray technology at detecting flaws in rocket motor casings. (In retirement, he pursued thermography as a substitute for X-rays in dentistry, but the investors never materialized.) After proving the effectiveness of IRNDT, he was removed from the program. Years later, he was visiting an Air Force base (name withheld), where he had been told IRNDT was under development. Curious about what had happened to his brainchild, he asked if he could visit the research site.

He was led out onto the tarmac and told to walk toward a distant hangar along a corridor marked off in painted lines. “Don’t put one foot outside the lines or you’ll be shot,” they said flatly.

At the entrance to the hangar, he was met by a guard carrying an M16. The guard made a call on a telephone, then opened a door. “Stay inside the yellow lines,” he warned. On the other side of the door, the corridor led across a vast, empty room to another door on the opposite side. When he got to the opposite door, another guard carrying an M16 opened it and escorted him down a long hall to a steel door with a narrow, shuttered slot, about head high. The guard lifted a phone and someone on the opposite side slid the shutter open. Light and sound poured through the narrow slot into the darkened hallway. My father could only see the man’s eyes. The whole thing struck him as absurdly comical as an episode of *Get Smart*. Behind, he could see a room filled with people working at desks, typing on typewriters and puzzling over data sheets, with tables filled with thermography-related hardware in the background. It was an exciting moment, because it meant that IRNDT had continued to flourish after he’d been exiled from it.

“Dr. Alzofon! It’s a pleasure to meet you,” said the man peering through the slot.

“Likewise.”

“What can I do for you today?”

“Well, actually I wondered what I could do for you.”

“In what way?”

“Well, I’ve been told you’re working on thermography, and I thought perhaps I could take a look around and offer some advice.”

“That’s very kind of you, but we’ve got it all under control here.”

“You know I did the original research on thermography at Lockheed Sunnyvale.”

“Oh yes, yes. We admire what you did, and to tell you the truth, we’re indebted to you, because without your work this division wouldn’t exist, but you’re much too high-powered for us.”

After another “Thank you for your interest,” the shutter closed and my father retraced his steps across the capacious hangar and the never-ending tarmac to the main office.

“It was the weirdest thing,” he said. “I was ‘too high-powered for them’—he must have said that three times, but what the hell does it mean?”

To someone with a rational frame of reference, none of this makes any sense, but in the Catch-22 world of bureaucracy, it is an everyday reality. By "bureaucracy," I mean *all* bureaucracies.

More examples could be offered, but enough has been said to illustrate the impact of the Colonel's words in response to my father's proposal to set up a program to research an antigravity propulsion system. Said the Colonel, "You might not qualify for a security clearance high enough to take part in a project like that." This Alice-in-Wonderland statement may *sound* like a joke, but my dad had enough experience to know that it was true. "The Manhattan Project" and the whole complex of paranoia, secrecy, and bureaucratic machinations made him deathly afraid that gravity-control technology would be taken away from him and sucked down a black hole where it would not only be hidden from civilian eyes forever, but denied to him—*the inventor*—as well. He told the Colonel that he wasn't interested and fled the office as quickly as possible with the Colonel's laughter echoing in the hallway behind him.

The foregoing smorgasbord of incidents and impressions, as well as others in the book, such as the FBI monitoring of our phone, goes some distance toward explaining my father's contradictory behavior in regard to his technology: On the one hand, he gave away the whole farm, lock, stock, and barrel, in the 1981 paper, and four other publications thereafter. Anyone with sufficient knowledge of microwave technology could have taken these and built the same device he built in 1994. On the other hand, he adopted Manhattan Project-like secrecy before, during, and after the 1994 experiments.

In the case of the 1981 paper, he gave everything away because he *wanted it on the record*. If it was all out in public, then there was no point in suppressing it or making it secret after the fact. It is also what makes any comparison between this book and a WikiLeaks disclosure ludicrous. Nothing in this book represents a disclosure or a leak. It is all old news, part of the public record in numerous ways since 1981, and it is in fact considerably less detailed than the 1981 paper, which has been downloaded several hundred times. He took the precaution of filing a patent application before publishing the paper, and he could not resist alluding to the success of the experiments as well *(see Appendix C, Refs. 5, 6, 8, and possibly others)*.

Even if telling all his secrets in the 1981 paper meant that gravity control was going to be stolen, that was still a more desirable outcome than having it buried forever. What he never counted on was the stubborn refusal of physicists schooled in general relativity to drop their blinders long enough to run the experiment. He also underestimated the slavish dependency of investors on the "expert opinion" of scientists who had everything to lose if the technology worked.

As for the secrecy cloaking the 1994 experiment, he thought that "they"—one or another of the alphabet agencies—would shut him down if they got wind of what he was doing. Nothing of the kind occurred, but at the time there was no way of knowing what level of secrecy was appropriate, so he opted for the maximum.

After the experiment was a success, he wanted to keep it secret because he was afraid that knowledge of the results might motivate someone with institutional backing to steal the idea. He was also aware of the flaws in the experimental setup, and he was afraid that publication would touch off a cold-fusion-like fiasco, with the experts hammering him for flaws he knew all about but was unable to address because of limited funds.

Publication of *How to Build a Flying Saucer* should answer the “cold-fusion-fiasco or no cold-fusion fiasco” question once and for all, but frankly, based on past experience, I expect it to cause nothing more than a negligible ripple in the fabric of space-time.

Appendix F

PATENT INFORMATION

ON THE ONE HAND, this book seems to offer the “secrets” of gravity control freely and without restriction. On the other, the DISCLAIMER *(p. 1)* states the following:

Dr. Alzofon filed a patent application for the technology described in this book in 1980. The patent application was turned down and went into suspension afterward. ***PUBLICATION OF THIS BOOK DOES NOT CONSTITUTE A SURRENDER OF DR. ALZOFON’S PRIOR PATENT CLAIM****, especially since we believe (“we” being Dr. Alzofon up until the time of his death, his patent attorney, other experts, and the Editor of this book) that the application was treated prejudicially and denied for insufficient cause*.

The cause given was the lack of a working device. However, as my father’s patent attorney pointed out, lack of a working device hasn’t stopped the patent office from granting patents in the past, as long as the components of the technology are based on known physical processes. This may explain some of the dubious “Star Trek” patents now on file.[76] If these patents represented real technology, the world would have changed, and it *hasn’t*—twenty, thirty, *sixty* years after the claims were made public.

For some reason, the patent office raised the bar for my father’s application. If and when someone successfully duplicates the 1994 experiment, they might like to join forces with me to revive the 1980 patent filing (see back page for contact information). The reward would be a more than generous division of revenue in favor of the party who provided the working device. If someone wants to file a patent application *without* contacting the author, they are free to do so. They would be relying on the notion of “prior art,” that is, the exposure of the technology to the public eye since 1981. However, the same doctrine would also *sink* their application, because *no patent can be filed on prior art*. Once proof of concept emerges, one can imagine the army of lawyers who would volunteer their services to the cause of mounting lawsuits on the basis that the patent should have been granted in 1980. I would be inclined to listen to them, but if those suits fail, the publication of the 1981 paper may turn out to be the best thing for the future of the planet, since it would allow the technology to spread unimpeded.

As far as patents go, the two best courses of action would be to join forces with the author as described above, or to file a patent on an actual flying saucer or similar device that included gravity-control technology as part of the design. One can imagine that at least a hundred thousand patents could be generated in this manner *(see p. 75)*. Think, for example, of all the patents generated by the internal combustion engine. The parallels are clear enough. However, working devices would be required.

If I had allowed concerns about patents and money to contaminate my motives for publishing this book, it never would have been written. As stated here repeatedly, the technology must spread far and wide and quickly—*very* quickly—if the planet is to be saved. Money means delay, as I have so often seen in Silicon Valley. Whenever money sat down at the table, insanity and bloodletting began. One need look no further than the current state of our beautiful blue planet, which has been carved up, poisoned, and damned near murdered—all for the love of money. As the Romans said, *"Radix malorum est cupiditas,"*[77] and they were translating from the Greeks, who were translating from the Bible. The problem of greed has been around for a long, long time, in other words. I can't think of a way of changing it. This book represents a different strategy: *enlisting* greed rather than *resisting* it. The result: rapid, worldwide dispersal of a green technology and of course—*saving the planet*.

Quotes appeared around the word "secrets" above That's because there *are* no secrets in this book. Everything's been out in the open since 1981. Anyone with the wherewithal and the expertise could have built a gravity control device, simply by gathering my father's publications and familiarizing themselves with the technology. It's all there: the process, the configuration of elements, the materials used, the microwave frequency, the pulse rate, the electromagnetic field strength, and all the source material from which these figures were derived.

Given these facts, I do not hold out much hope for reviving the 1980 patent application. However, in addition to the humanitarian purposes that inspired this book, it was important to establish my father as the inventor, should anyone else try to take credit for gravity control if and when it is fully proven, and as surely as the sun will rise tomorrow, "they" *will*. It was also important to put the theoretical basis for the technology on the record—yet again—so that physics can advance into the twenty-first century with the right tools for the job at hand: the conquest of space and our graduation to cosmic consciousness, if not cosmic citizenship. In this, I can only hope, the present volume has succeeded.

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[76] *Four of these are reported in* The Secret History of Extraterrestrials, *by Leo Kasten, (Bear and Company Books, Rochester, VT, 2010, p. 164–167), but this is by no means an exhaustive list of "patents without devices."*

[77] *"Greed [or 'the love of money'] is the root of all evil. "*

THE INVENTOR, A BRIEF LIFE

FREDERICK ALZOFON was born in Detroit, Michigan, in 1919, the youngest of six children, including four sisters and a brother. As a scientist, he never gave any credence to astrology, but, as a child of the ’60s, I can’t resist noting that at the time of his birth virtually all the planets were in one house, implying enormous concentration in one area. As it happened, the chart proved to be prophetic, as he was to concentrate all of his considerable mental resources on physics throughout his life, devoting himself in particular to the search for a unified field theory that would resolve the problems of quantum mechanics and general relativity.

If you are old enough to remember Lt. Columbo, the TV detective in the “dirty raincoat” who bedeviled upper-crust murder suspects with “one more question,” you have a pretty good idea of the way he carried himself. He walked with a rapid, deliberate gait, slightly bent over at the waist, absorbed in his own thoughts, which ran along a different track from everyone else and were generally rather serious.

Like Columbo, he wore the same threadbare, beige raincoat, white shirt and blue tie to work, day after day, no matter what the weather, for decades. Like Columbo, he was a bit goofy: He drove a clunky old beater (a 1950 Plymouth with a stick shift), and paid no attention whatsoever to traffic.

A CHP officer pulled him over on the Bayshore Freeway one morning in the 1960s and asked him why he was going forty miles an hour when the speed limit was sixty-five. “I was thinking about equations,” he said. It was a novel excuse, but it didn’t get him off. I feared a car ride with my dad more than a ride on the most radical roller coaster in creation.

As far as his manner of speaking, the only public figure with whom I can find any parallels is Noam Chomsky. Like Professor Chomsky, he seemed to know everything about everything, and he had processed it all into some new and higher form of knowledge. He was an extraordinarily fast reader and retained everything he ever read. As far as literature, he liked Charles Dickens and Shakespeare better than the Russian or French novelists. I can’t say what he liked in modern literature, but whenever I mentioned anything, he had read it. Case in point: Lee Child. When I caught up on all of the Reacher novels, I told him he might enjoy them, and it turned out he’d already read every single one, and I hadn’t had a clue. He was an avid reader of science-fiction from the 1930s through 2012. While he was devoted to physics, he was a keen observer of politics, pop culture, social movements, and the cinema. If you asked a question of him, you were likely to get a lecture, but it would be a pleasant one, incredibly dense with information, rife with unexpected insights, with long arcs of reasoning navigated in a calm voice, as if read from the pages of a book—again, much like Professor Chomsky.

Politically? *Not* like Chomsky. Not like anyone else in the world, either. Ever. Another book will be required, and this is not the place to begin writing it.

His parents were Russian Jews who fled Odessa in the early 1900s, after sword-wielding Cossacks began riding through the streets, slashing random villagers.[78] Friends assured them that the violence was a temporary aberration and would soon blow over. The “temporary aberration” turned out to be a lethal tide, however, and the villages they left behind, Duvassar and Hirhutsk, return no results on Google today—obliterated by two world wars, in all likelihood. My father grew up in a rough and tumble part of Detroit the locals called “Hell’s Kitchen.” In an odd parallel, boxer Joe Louis grew up in the same area at the same time after *his* parents fled racist persecution in Alabama in 1926.

Because of his humble origins, my dad developed a lasting empathy for oppressed people and humanitarian causes, but he was especially sympathetic toward animals. My first memory is of my dad trying to save the life of a tiny chick that had fallen out of its nest and was being pecked to death by blue jays. This occurred on Point Loma in 1954, when I was four. When we lived in Santa Barbara I remember him jumping in the water at the marina to save a drowning dog. The dog showed his gratitude by drenching my dad in a shower of salty spray as they stood side-by-side on the dock after the dramatic rescue. Toward the end of his life Frederick was contributing regularly to the Jane Goodall Institute.

He was singularly unimpressed by fashion, social status, or the trappings of wealth and power. The expression “marched to the beat of his own drummer” was probably made up with him in mind. This attitude often put him at odds with authority. He didn’t like conflict; he simply insisted on calling the truth as he saw it. Period.

Philosophically, he called himself a logical positivist. This isn't surprising, since Professor Lenzen was a student of Bertrand Russell. Intellectually, his greatest gift was an ability to absorb enormous amounts of information and see abstract patterns within all the confusion that others did not see. He also had an unmatched talent for generalization, that is, inductive reasoning. He viewed science as an alternation between inductive and deductive reasoning. I often asked him how he acquired his talent for generalization, and he said, "Practice." I didn't believe him. Practice may have sharpened it, but it was a natural talent and quite off the scale.

Though his dad was a watchmaker and a gunsmith, Frederick became fascinated with science, particularly physics and mathematics, while a preteen, and he began self-teaching by reading all the books he could find on these subjects in the city library. The stories of the ancient Greek mathematicians, Archimedes and Euclid, had a profound effect on him, and I remember him lecturing me on the origins of "Eureka!" when I was six years old. The triumphs of modern physics, especially the genius of Albert Einstein, inspired him. When he graduated from high school he was offered a music conservatory scholarship but declined in order to pursue a career in physics and mathematics. Ironically, he began losing his hearing in his thirties and was almost deaf by the time he was seventy.

The path of science led him to UCLA. In 1941, he graduated with an A.B. in Mathematics and a minor in Physics. As an undergrad he worked in a prop shop on Sunset Boulevard in Hollywood and carried a spear as an extra in a production of *Aida*.

In 1942 he entered the graduate program in physics at Cal Berkeley, where he conducted research in elementary particle collisions at the cyclotron (E.O. Lawrence, who received a Nobel for inventing the cyclotron in 1939, was head of the laboratory at the time). His professors included J. Robert Oppenheimer, David Bohm (who was working on his PhD with Oppenheimer as his advisor), J. W. Weinberg, Victor Lenzen, and Raymond Birge. Nobel Prize-winning chemist Robert Millikan sat on his doctoral committee. First-hand anecdotes about these larger-than-life figures were a steady staple of my childhood.

Frederick received an M.A. in Physics in 1948, and pursued a doctorate as far as his PhD orals, but he abruptly switched to the Department of Mathematics, even though it set him back years. In 1956 he received his doctorate under Professor Griffith Conrad Evans (1887 – 1973), Department Chairman and namesake of Evans Hall of Mathematics. It is said that he was Evans' last PhD student. When my dad received his doctorate, he called his mother to celebrate, and she told him that he was the wrong kind of doctor.

Apparently his break with the Physics Department came about when, after he had already passed his orals, a hostile professor ambushed him with an additional exam over and above what was required. The conflict may have been exacerbated by my dad's tendency to correct his professors' blackboard equations in front of the class (something I learned about from my mom). His focus was particle physics, but the added question was something like the following: "You have a twenty-foot wire with a short circuit somewhere on it. How do you locate the short circuit?" When he couldn't answer the question, they failed him. Later, he found out that the exam had been optional, but they hadn't told him. That's when he abandoned physics and switched to mathematics. While he had nothing but praise for Professor Evans, the episode in the Physics Department made a lasting impression on him and was partially responsible for his decision to leave academia for aerospace in the early 1950s, and his distrust of academia before, during, and after the 1994 experiment.

His doctoral dissertation was entitled *Multiple-Valued Functions and Sommerfeld's Method*. The virtue of Sommerfeld's Method was that it provided exact solutions to diffraction problems. Its limitation was that it could only be applied to an infinite half plane. Expert opinion, including Sommerfeld's, was that the method could not be extended to objects of arbitrary shape. In 2004, when he was eighty-five years old, he published *Two Methods for the Exact Solution of Diffraction Problems* (SPIE Press, Bellingham, Washington), a theoretical treatise that succeeded in extending Sommerfeld's Method to objects of arbitrary shape. The book, which has implications for DVD technology and radar imaging, has been the subject of research at the University of Taiwan. One of the professors visited him in Oregon. Bootleg copies appear in technical libraries all over China, a fact that amused my dad. He always felt that Sommerfeld's Method had a wealth of unrealized potential, and he was working on another book on it at the time of his death in 2012.

While in the PhD program at the University of California in the 1940s, he took a keen interest in relativity because, among other things, it had a direct bearing on his research at the cyclotron. In 1949, he published "Relativistic Neutron-Proton Scattering in the Born Approximation" in *Physical Review* (75, 1949 1773). He was also having frequent discussions with Professor Victor Lenzen (1890–1975), an acknowledged expert on the subject. It was during this period that he conceived of a unified field theory based on a minor revision of special relativity.

The mounting responsibilities of marriage and children caused him to leave academia for aerospace research in the early 1950s. From 1951 to 1952 he was a researcher at the Naval Radiological Defense Laboratory at Hunters Point in San Francisco. From 1952 to 1953, he conducted research in long-range underwater sound transmission at the Navy Electronics Laboratory in San Diego and taught calculus to artillery specialists. My earliest memories date from the period we lived in a drafty cabin in a eucalyptus grove on the Pacific side of Point Loma and later when we lived in the Sunset Cliffs neighborhood. From 1953 to 1956, he was a physicist at the Santa Barbara Research Center in Goleta, where he conducted research in the theory of infrared detector technology.

Though he had become disaffected with academia, his love of research never wavered, and, in spite of having a full plate at work and at home, he continued to invest every spare moment in his unified field theory. After a meeting with Richard Feynman at Caltech in 1954, he dedicated all of his spare time to publishing his theory of the origins of gravitation (*see Milestone I, p. 93 and Milestone II, p. 97)*. This was in addition to his work on his PhD thesis.

In 1956, he was hired as a mathematician at SRI (Stanford Research International) and moved to Palo Alto. There he met Professor Hal Puthoff of Stanford, whose ideas on gravitation paralleled his own. He and Puthoff became friends and remained in touch on a collegial basis at least through the late 1990s. According to Google, Dr. Puthoff is now CEO of the privately funded research organization, Earthtech International, Inc., in Austin, Texas. As gravity control is one of the prime objectives of the organization, it is hoped that this book will light the way toward success in this area for them.

In 1960, he published "The Origin of the Gravitational Field" in *Advances in the Astronautical Sciences*, a publication of The American Astronautical Society (Vol. 5, Plenum Press, NY). (*See p. 103 for more.)*

From 1958 through 1969 he was a staff scientist at Lockheed Missiles and Space Company, Sunnyvale. Among his accomplishments there were experiments he conducted proving the feasibility of infrared nondestructive testing, and moreover, its superiority to X-rays in the detection of structural flaws in rockets or soft materials, such as O-rings. When it became clear that funding cutbacks were coming, he transferred to the Houston Aerospace Division of Lockheed Electronics Company, where he supervised analysis of data acquired by optical instruments.

While working at Lockheed, Houston, he completed his first book, *Multiple-Valued Functions in Three-Dimensional Space and Sommerfeld's Method*, which was published under the auspices of the Houston Aerospace Division of Lockheed. The origin of the book, he told me, was his observation of anomalies in collapsing magnetic fields while doing research at the cyclotron. He found it convenient to explain these anomalies in terms of multi-leaved spaces, or "multiple universes." You would never know it to read the mathematically-oriented book, but he always felt that the multiple universes he described might explain ESP or what people referred to as "the afterlife." He wanted to devise experiments to test this hypothesis, but he never had the opportunity to follow up.

In the summer of 1970, while I was living in Houston, my parents agreed to a divorce. In August, Hurricane Celia, a Category 3 storm with winds of 125 mph, hit the Gulf Coast, and foolishly we decided to weather it out in Seabrook, less than a mile from the water's edge. On the day the storm made landfall, the sun set at three o'clock in the afternoon. The rising Gulf inundated the exit roads while we boarded up our windows. That night, the storm descended in full fury. The winds nearly ripped the house apart while the deluge hammered walls and windows with terrifying force. In the street, a barrage of lightning bolts struck everywhere all at once—houses, telephone poles, trees, drainage gratings, and the lightning rod on our roof—leaving us cringing like soldiers in a trench with artillery shells exploding all around. Perhaps this was the origin of my respect for climate change.

From 1976 through 1978, my father moved to Long Beach to work as an infrared and optics engineer at Rockwell International, where he analyzed the performance of satellite-mounted military observation systems.

In 1978 he moved to Seattle to become a senior staff scientist at Boeing Aerospace, again working in infrared and optics design. He repeatedly declined promotions in order to continue his spare-time research on Sommerfeld, gravitation, and unified field theory. This led to his 1981 paper, “Anti-Gravity with Present Technology: Implementation and Theoretical Foundation,” which was delivered at the 17th Joint Propulsion Conference in Colorado Springs *(see Milestone IV, p. 109)*. Convinced of the value of researching the proposed technology, he began to seek financial backing from government, private industry, academia, and research foundations.

In 1984, at the age of 65, he retired from Boeing and moved to Corvallis, Oregon. It was the beginning of the most creative period of his life. Finally freed from the necessity of working for others, he devoted himself entirely to research on gravitation and other topics, including heat conduction in solids (to which he applied techniques of optical analysis), the transition to turbulent flow in fluids (a problem that had defied complete understanding and mathematical expression for a hundred years), and of course, Sommerfeld’s Method. All of his papers and books on these topics were published. In 1994, he finally succeeded in mounting experiments to test his theory of gravitation. The experiments were a success, but he decided to keep the results a secret while he sought investor backing.

In 2003, at the age of 84, he delivered an address on the special theory of relativity and the speed of light to the American Association of Physics Teachers in Guelph, Canada, and received a standing ovation. By then he had become tired of the effort to find backers, so he returned to fulltime research in Sommerfeld’s Method and unified field theory. Even in his nineties he made daily trips to the library at the nearby University of Oregon to order foreign-language physics journals and rare publications, such as a book by maverick physicist Burkhard Heim (1925 – 2001), which was only available in German. He had been interested in Heim since the early 1980s, when he wrote to the theoretical physicist, asking for a copy of his book. The letter had gone unanswered. Part of the reason, one might surmise, is that Heim had lost both hands and most of his hearing and eyesight at the age of nineteen in an explosion at a chemical lab in Nazi Germany. He was also known to be eccentric and reclusive. What intrigued my father most was Heim’s claim to have calculated the mass of elementary particles. After studying Heim’s abstruse theory for more than two years, he concluded with great disappointment that its complexity masked a lack of substance.

In 2009, he turned once again to unified field theory and wrote his final paper on the subject, “A ‘new and simple idea,’ dark matter-energy and the crisis in physical theory,” which he dedicated to Richard Feynman (*see p. 269*).

Beginning in the early 1970s, my dad had suffered from recurring attacks of melanoma. The first led to emergency surgery, during which the tumor was traced deep into his sinus cavity. Part of his upper lip and sinus cavity were removed. In the mid-1970s, while he was living in Long Beach, he developed thyroid cancer and it, too, was removed. In 2012, at age 93, he was admitted to the hospital for weight loss and an inability to swallow. Doctors discovered that a melanoma, which had been caught and excised early, had spread to his right lung. The tumor was inoperable. Upon returning home for hospice care, suffering from starvation and dehydration, his mind clouded by heavy doses of morphine, he sat up in bed and read the *New Yorker* magazine, as he had done routinely for decades. Then he put it down on the nightstand and slipped into a coma. He died peacefully early on a snowy Tuesday in December, 2012.

Doctors who examined my dad for military service during World War II discovered that he had a cardiac arrhythmia and an enlarged heart. They classified him “4F” and told him he would be lucky to live beyond the age of 30. It seems thematic for a man with a lifelong resistance to the pronouncements of authority that he survived until the age of 93 and kept his wits about him until the very end. As someone who knew him, I often think that his ever-active imagination and brilliant intellect were what sustained his body three times longer than the allotment granted by medical science. The irony would not be lost on him: *He defied science to lead a life dedicated science*.

The inscription he chose for his gravestone read simply, “Frederick Alzofon, Scientist.” Whatever the fate of the UFT or gravity control, I hope that new generations of scientists will find inspiration in the creativity, dedication, intellectual honesty and rigor, and the endless capacity for hard work evidenced in his unique contributions to mathematical physics and applied science.

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78 *My granddad on my mom’s side was from the Frisian islands, off the coast of Denmark. He was a pipe-smoking sailor who stubbornly insisted on navigating the highways of Florida and Ohio by the sun and stars. Needless to say, he got lost a lot. My grandmother came from a village on the border between Scotland and England. Her nationality depended on who was winning the war at the time. She was a redhead, however, so she probably leaned toward Scots. My mom had Nordic features. She was tall, kindhearted and compassionate, with blue eyes and blonde hair, but she was definitely an earthling, not a Pleiadian.*

ABOUT THE EDITOR

David Alzofon was born in Berkeley, California, in 1950, attended public school in the San Francisco Bay Area, and graduated from the University of California, Santa Barbara in 1972, receiving a BFA. He returned to the Bay Area soon afterward and began writing for a local newspaper. In the mid-1980s, he joined the personal computer revolution as a technical writer.

Twenty years, a hundred manuals, and six failed start-up companies later, Mr. Alzofon decided that time was running short. In 2007, he gave up on Silicon Valley and dot-com dreams and vowed to devote his remaining time to writing only about things that mattered to him.

The thirty-five years between 1972 and 2007 might be considered a mere prelude to the quest that began when his father died in December, 2012, a quest that led to *How to Build a Flying Saucer (And Save the Planet)*.

Mr. Alzofon currently resides in southern California, where—when not fleeing wildfires spawned by the drought (an early gift of global climate change)—he spends most of the day writing. His next book will be a collection of his father's unpublished lectures on Einstein's special theory of relativity.

A TAOIST TOAST

THE LATHE OF HEAVEN is a prophetic novel by Ursula K. Le Guin, published in 1971. The mysterious title comes from Le Guin's translation of a Taoist verse that refers to a remorseless balancing force in Nature. Beyond the grasp of the intellect, it confers wisdom on those who choose to abide with it in harmony. It destroys those who do not.

The unlikely hero of the novel, George Orr, is a passive, hypersensitive individual noticeably lacking in self-confidence. Orr has only one talent: *dreaming*. But there's something most extraordinary about his dreams: *they change reality*. No one knows of his power because only *Orr* remembers how things were before one of his "effective dreams" came along and rewrote history down to the last syllable of recorded time. Everyone else carries on without a clue.

As fate would have it, Orr is all that stands between humanity and the apocalypse. It is not a role he desires. His therapist, Dr. Haber, however, would be only too happy to relieve him of his gift. Haber is a brilliant man and a paragon of scientific reason whose keen intellect rapidly determines that Orr is a witless fool whose power must be harnessed (by Haber, of course) to create a more perfect world. Strangely, every magical dream that Haber dictates to Orr leaves the world in worse shape than before, while elevating the good doctor to positions of ever greater power and influence.

Visionaries are like George Orr: their dreams shape reality. But for every visionary there are ten thousand Dr. Habers, lusting for power and pursuing it at full throttle with blinders on. For millennia, the Haber subspecies of humanity has been stealing dreamers' dreams, taking them as an only just entitlement on their road to dominance, and now, finally, at long last, they've managed to steer us by ineluctable steps to the brink of the abyss where we come face-to-face with the merciless scything blade, the lathe of heaven. And, just as in the novel, only the dreamers are capable of pulling us back.

"It is possible," wrote H.G. Wells in *The Discovery of the Future* (1901), "to believe that all the past is but the beginning of a beginning, and that all that is and has been is but the twilight of the dawn. It is possible to believe that all the human mind has ever accomplished is but the dream before the awakening."

Here's to dreamers, then, and a new awakening.

May it come soon.

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Copies of the book are available on Amazon.com.

At the time of publication (January, 2017), nothing has been posted on social media, but this will change.