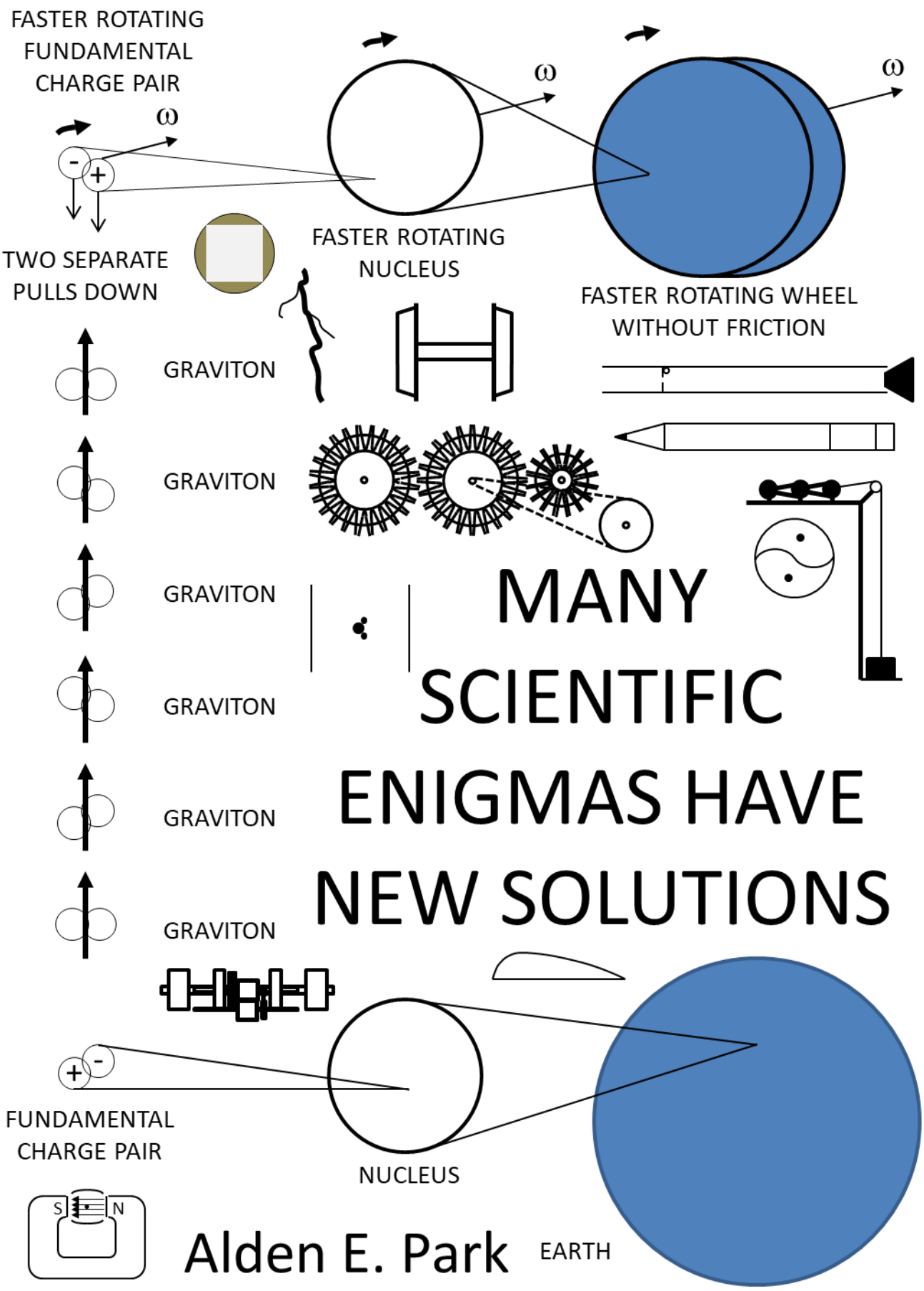

FASTER ROTATING
FUNDAMENTAL
CHARGE PAIR
ω
ω
ω
TWO SEPARATE
PULLS DOWN
FASTER ROTATING
NUCLEUS
FASTER ROTATING WHEEL
WITHOUT FRICTION
GRAVITON
GRAVITON
GRAVITON
GRAVITON
GRAVITON
GRAVITON
MANY
SCIENTIFIC
ENIGMAS HAVE
NEW SOLUTIONS
FUNDAMENTAL
CHARGE PAIR
NUCLEUS
S
N
Alden E. Park
EARTH

MANY SCIENTIFIC ENIGMAS HAVE NEW SOLUTION S

ALDEN E. PARK

DEDICATION

If you are a ponderer/questioner/solver of scientific puzzles, then this book is dedicated to you.

DISCLAIMER

The views in this book are those of the author and do not necessarily reflect those of any particular religious, political, governmental, educational, or commercial organization.

EXECUTIVE SUMMARY

In this book, I solved or referred to my solutions of at least 89 = 15 + 64 + 10 scientific enigmas. I presented 15 enigmas and then I provided detailed solutions to the 15 enigmas in reverse order, which means that the presentation to solution order is chiastic. I then made reference to my solutions of 64 = 27 + 2 + 16 + 19 more enigmas. For extra emphasis in the Appendix A, I solved at least 10 more enigmas. I came up with all the solutions using only a few new principles. If people do not accept the principles as being valid, then they will not accept my solutions as being valid. I especially think people should consider the Bessler principle, which may be found at the chiastic center of this book, meaning at the center of the 15 enigmas. If people begin to accept the new principles as being valid, then the principles provide 89 new solutions to the 89 scientific enigmas. If people do not accept the new principles, then they are essentially left with no reasonable solutions for the 89 scientific enigmas. In the search for truth, surely it is much simpler to accept a few new reasonable principles as correct, to solve the 89 scientific enigmas, than to not accept the few new principles and not have solutions to the 89 scientific enigmas. So as not to suppress the truth as has often been done in times past, I recommend that we embrace the few new principles and accept the new solutions as being correct, after doing some suggested experiments, if there is any doubt about the principles. Using the new principles, many more solutions should be found for many more enigmas, as more enigmas are found to be within the guidance of the principles. If I have made any errors in my solutions, then others will in time be able to point out my errors and provide corrections. I have proposed many experiments, which should be done to test out these principles. There has been a long history of not doing applicable experiments to test out the principles, suggesting much suppression of the studies. Using information which I provided, I

advocate the development or redevelopment of the 24-7 green energy productive devices: the Papp engines, the Sweet Sixteen family of cylinders, the Orffyrean roller bearings (for reinventing Bessler wheels), the Stanley Meyer fuel cell, and artificial suns without any radioactivity problems. I currently favor the reinvention of the Papp engines, though my second favorite would be the artificial suns producing infrared radiation using stress-reinforced horizontal-magnetic-field C-shaped-magnets, one atmosphere of hydrogen, and extra surfaces for attaching magnetic dipoles of hydrogen. Until the Papp engines are reinvented or artificial suns can be produced, (1) we can make much better use of the existing GEET reactors which can be nearly 24-7 (with some fuel assistance and if plenty of cool water is available) and (2) we can commercialize the use of the Yildiz magnetic motors, which are existing perpetual motion devices powered by energetic gravity. As new 24-7 green energetic devices appear, without any subsidies, the markets should favor the most energetically cost effective solutions or least expensive solutions in dollars/(kilowatt*hour). More 24-7 green energy solutions should become available with time. I am advocating many other things to produce much energy using the Bessler principle.

FOREWORD

Follow on Book. This free book mainly follows on from my free book, ***Gravity-Wheel Unveiled*** or ***GWU***. I make some attempts at simplification but there are also various reasonable additions. After chiastically presenting 15 solutions to 15 scientific enigmas (meaning the order of the solutions is exactly in the opposite order as the presentations), I give some new insights to how Egyptians built some pyramids, to how the Chinese originally used of the Chinese yin-yang symbol, and to how the Olmecs likely moved some massive stone pre-heads. Then I provide ideas about how artificial suns may be produced. Then I attempt in the appendix to explain a few additional devices/mysteries and why they work/occur. These include my comments on the double-helix vortex-tube, the water bridge, the reinvention of the Stanley Meyer fuel cell, a variety of lightning related phenomena, and reasons why the expansion rate of the universe is not constant.

Important Energy News. I think that this book's main message is the most important energy news-story of our time. The use of energy affects almost all facets of our lives. This book speaks of the oncoming rotational energy revolution, which will begin to affect nearly everyone on this planet either when say the existing Yildiz perpetual motion device is used for commercial energy production or when the existing GEET reactors are more extensively used or when any one of three 24-7 green-energy perpetual-motion-devices are reinvented for producing very-low-cost energy, using information which I provide for their reinventions. There are many other devices, including a couple more 24-7 green-energy perpetual-motion-devices needing to be developed/redeveloped according to my explanations (the artificial suns and the Meyer fuel cell), which might help bring forth the message. Still, the message has long been suppressed and continues to be suppressed in many ways. I try in this book to provide compact compelling evidence from a variety of

perspectives, which cannot be easily denied but should be considered by the most repressive scientists. Breaking through the circled wagons of the scientific elite is a difficult task but it is possible, when the full weight of the much evidence is allowed to make its case or when many new rotational-energy experiments are done. Wasn't the experimental method the primary message, which Galileo Galilei tried to bring forth?

Suppressed Energy Enigmas. The truth, about energy enigmas, has been greatly suppressed in the past. The suppression of the enigmas occurred at these approximate times: millennia ago (Egypt and China), three centuries ago (Bessler), a century ago (ED.L. and railroads), a half century ago (McKinley, Papp, and leakage currents), three decades ago (cold fusion, Meyer, and GEET), and two decades ago (Yildiz). I think that mounting evidence, of energy enigmas, has long been suppressed by a variety of means. I think that solutions or explanations, for many energy enigmas, have also been suppressed by a variety of means.

Some Rally Cries for Suppression. Despite persistent evidence, here are some of the rally cries, which provide a portion of the suppression of the enigmas and their solutions. Energy must always be conserved according to the first law of thermodynamics. Mass-energy can neither be created nor destroyed. Without an external source of power, perpetual motion devices are impossible, as demanded by the first and second "laws" of thermodynamics. Are those rally cries actually true? This book will address such things.

Science Is Subject to Experiments and Observations. Science requires that the complete evidence be acknowledged and considered. The "scientific" rally cries are not subject to popularity contests but rather are subject to the complete experimental data and evidence. The "laws" of science are subject to experimental tests and observations.

Truth Eventually Breaks Forth. There comes a point in time in which the truth about many energy enigmas and their solutions must break through the various types of suppression. As it breaks forth, it does become an energy news story. I think that the time has nearly arrived for the energy news story to come forth.

Energy News Story Comes Forth. As many scientific enigmas are shown to have new solutions in this book, I thus make a compact case that there is an important energy news-story, which needs to come forth. It is hoped that this book will cause many readers to learn of the greatly delayed news story and to receive the messages of the solutions to many scientific energy enigmas. Because of prevailing suppression, I think that there has been very little discussion or experiments surrounding these solutions, so it is hoped that there will be a marked increase in open discussion, observations, and experiments with respect to these energy solutions. I provide some information for reinventing at least three energy productive devices (and developing to two other energy productive devices, according to my instructions), which might be considered to be perpetual motion devices powered by external power sources of energetic gravity. I also mention at least a couple of other existing perpetual motion "devices", the sun and the

magnetic motors of Yildiz, which should help pave the way for more devices appearing. I think that there are a variety of paths to very inexpensive green-energy-solutions, which will be available 24 hours per day, seven days per week. The future of energy is critical to a wide variety of subjects of great importance. Abundant sources, of inexpensive 24-7 green-energy, provide many important uses of energy for our earth's future. When I say green-energy, I am not talking about any expensive non-full-time green-energy-scam, which are designed to mainly provide benefit over a relatively short time. I am talking about energy independence by continual/perpetual power-production for many people, without consumption of non-renewable resources.

Book Overview. If you are initially only interested in knowing what the Bessler principle is, then you might first consider reading within this book's middle section, "Some Ideas for Solutions to Enigmas". The first part of this book presents 15 scientific energy enigmas. The last part of this book provides new explanations for those scientific energy enigmas. The order of explanations is chiastic or FILO to the order of the presentation of the enigmas. The term FILO means first-in last-out. Then I consider some implications regarding those solutions and other solutions in the large "Afterword". If you want to challenge your problem solving capabilities, then I suggest that you hold off on looking up my solutions. Can you figure out explanations for any of those 15 presented enigmas, without first taking a peek at my explanations/solutions? I think that I can somewhat resolve at least 89 scientifically enigmatic subjects.

Prior Free Book. I provided my 712 page book, ***Gravity-Wheel Unveiled*** (***GWU***) 18 March 2019, for free download at the top of https://gravityunveiled.home.blog/ in pdf form. My book, ***GWU***, provided explanatory discussions regarding such diverse things as: an attempted discrete theory of everything, the nature of our universe, additional energy source for energetic cosmic rays, new matter, finest most-fundamental-matter, new space, the graviton, matter intelligence, the future knowing the past, the past knowing the future, an actual modern-day or new type of Maxwell's demon, the Bessler principle, the forces not conserving energy, inexpensive future energy, the sun not primarily obtaining its energy by hot fusion, remediation of radioactive nuclear wastes, the yin-yang symbol, Egyptian pyramid construction, decoding of two old little books, solutions to many previously unsolved physical problems, locations of geographic things, some historic things related to wheel use, and perpetual motion. Though not necessary, we could first imagine that we applied some slight changes in the short file, https://gravity-wheel.neocities.org/GravWheelChanges.txt so as to correct ***GWU***. With time, I will try to continue to provide any corrections to ***GWU***, which I notice. I can also try to provide in that text file corrections to this book, ***MSEHNS***. I noticed a problem getting to my gravity-wheel site because of my firewall. The 712 page book, ***GWU***, provides many more findings than in this book, ***Many Scientific Enigmas Have New Solutions*** (***MSEHNS***) but there are some new findings in this book.

This book is much more compact than ***GWU***, since ***MSEHNS*** is much more limited in scope. It provides what I think are the most essential/important solutions to some of the problems/phenomena presented in ***GWU***. That book, ***GWU***, provides solutions to additional problems/phenomena. I often show page numbers and figure references to ***GWU*** to help point out useful prior discussions, in case you have further interest. This book, ***MSEHNS***, does contain more comments on how the Egyptian pyramids were likely built millennia ago. A method is now proposed for how the ancient Egyptians could have rolled normal blocks to the pyramids and then rolled them up their sides. More new enigmas are given new solutions. This book also provides my instructions for developing a couple of types of green 24-7 energy productive devices (artificial suns and Meyer fuel cell), which were not covered in ***GWU***.

Fully Decoded Little Books. In ***GWU***, I decoded the "little books" written by two authors (published independently in 1717 and 1936) each regarding their own enigmas, which I now briefly address in this book, ***MSEHNS***. My full decoded versions of those coded little books were available in two appendices (B and D) of ***GWU***. I broke out those two appendices into two decoded books, ***Bessler's Little Book Decoded*** (***BLBD***) and ***A Book in Every Home Decoded*** (***BEHD***), which I made available for free as pdf files on my blog site. I made them into separate books, since I figured that the decoded books were important by themselves. I think that both the authors of the coded versions figured that upon decoding they would need to be expanded into huge books. I cut short the expansions out of necessity so it is up to the readers to imagine how they could be expanded into their own especially huge books, dealing with the fundamental physical principle, which was also the decoding key for each book. I suggest that you initially hold off on reading my decoded little book solutions to save you time now and to give yourself a chance to ponder somewhat upon solutions to the enigmas. If you are interested, you can later read the decoded little books. To give you some ideas of how the huge versions could go, you can use your imaginations as you later read my huge book, ***GWU***. My decoding of the two little books was necessary for obtaining instructions for reinventing the particular energy productive devices associated with each little book.

Free PDF Versions of My Books Available. At my blog URL of https://gravityunveiled.home.blog/, I have been making available free pdf versions of my books: ***Gravity-Wheel Unveiled*** (***GWU***), ***Bessler's Little Book Decoded*** (***BLBD***) and ***A Book in Every Home Decoded*** (***BEHD***). I plan to similarly make available at my blog URL free pdf versions of this book ***Many Scientific Enigmas Have New Solutions*** (***MSEHNS***). I give permission for some other URLs to provide free pdf versions of my four books (***GWU***, ***BLBD***, ***BEHD***, and ***MSEHNS***) to make the versions more readily available (in case my blog site is down or unavailable and to avoid too much traffic on my blog site in case my blog site is up), as long as the URLs offer the service for free and without any charge. I will try to show on my neocities URL, https://gravity-wheel.neocities.org/, where there are some alternate locations for people to obtain my four free pdf books (***GWU***, ***BLBD***,

BEHD, and ***MSEHNS***) in case my blog URL is down or unavailable. In case you are viewing my pdf files and they show black background with white letters (as I did not intend), then you might try switching to white background and black letters using Acrobat XI > Edit > Preferences > Accessibility > deselect Replace Document Colors.

Other References. Other related references may be found below in "Bibliography and Notes". Some of the links there and in this book had to be updated from those found in ***GWU***, since some URLs changed or no longer exist. If in time any of my currently referenced sites disappear, you may need to find similar sites, but the currently referenced URLs are acknowledged as being there during part of the time of my writing of this book, from 23 December 2020 to 3 June 2025.

Alden E. Park – 3 June 2025 – Fresno, California

CONTENTS

FIGURES

SOME SCIENTIFIC ENIGMAS

Can you guess the solutions to any of the scientific enigmas or puzzles or riddles or mysteries or curiosities or problems that I will bring up in this first part of this book? If not, you should read the middle and last parts of this book to find their solutions. Can you find connections between some of these puzzles as you consider

their solutions? Such connections might lend themselves to potential solutions. As you read a solution, can you guess the next solution, using knowledge of all the prior solutions?

Chiastic Order. I plan to solve the stated puzzles in the same order that a clerk may want to deal with items in an in-out basket. It is a first-in last-out order or FILO. Such a reverse order of solutions is chiastic. A chiasm provides a pattern, which pattern is then repeated in the reverse order. The chiasmus is a type of ABBA or ABCCBA or etc. poetry that typically survives translation. Why am I presenting the puzzles and solutions in chiastic order? I think that gravity often shows inherent chiasms. I wanted to create a very clear distinction between the puzzles/enigmas and the solutions/explanations. I also want to especially give you plenty of opportunities to consider solutions to often somewhat older scientific enigmas, without prejudice to the solution spaces, according to long established "wisdom". I also think that the enigmas should be considered or pondered upon in toto. Furthermore, I am trying to stretch the thinking of people, as I suppose Bessler was trying to do in his many chiasms within his 1716/1717 dual poetic booklet, ***Apologi'sche Poësie und Poetische Apologie Von seinem MOBILE PER SE und PERPETUUM MOBILE***. This title of his booklet contains a third level chiasm followed by a second level chiasm. I think that I have not found all the chiasms in Bessler's booklet, though I have found many. I strongly suspect that there are many more chiasms, which are waiting there to be discovered. Just like the challenge of finding many chiasms in Bessler's booklet, part of the fun of many puzzles is in the solving of them. His title made reference to poetry so the rhyming satisfied the casual student's question as to where the poetry was. The rhyming poetry was obvious in Bessler's booklet but the study of the hidden chiastic poetry provided extra hitherto hidden-treasures for the more serious student. Bessler/Orffyreus left plenty of clues that he was providing a puzzle and he seemed almost jubilant that he had left its 1717 solution, with that 1717 chiastically matching up with XLVII (or visually like X17 or chiastic 1717). Bessler played all sorts of chiastic and visual games with his readers. There were too many to be briefly discussed here so I will mainly just skip them. See the Appendix B of ***GWU*** for more discussion.

As and after I present the puzzles, I hope that you, the reader, try to consider or think carefully about new ideas of how these puzzles might be solved or explained. I especially hope that you try to consider new explanations, which might simultaneously explain multiple puzzles. I hope that you don't immediately and naively dismiss any single puzzle with a loud shout of "hoax" or "fraud" or some choice ad hominem, without expending the least bit of thought toward an actual solution to the puzzle. I think that especially delaying solutions to the earlier puzzles will cause great pause to well-entrenched historical prejudices, with respect to actual consideration of solutions. Afterward in the Afterword I provide a self-test to see if you are still trapped by some prior falsehoods.

I now provide 15 examples of some scientific puzzles/enigmas, which I will then solve in the last part of this book, ***MSEHNS***. The last will be solved first and the first will be solved last. That sentence is a third level chiasm.

1 Riddles of Bessler's Wheels

The riddles of Johann Ernst Elias Bessler's most famous wheels form an extensive body of information. See John Collins' 1997 book, ***Perpetual Motion: An Ancient Mystery Solved?*** (***PM97***) for many details. Collins mentioned on p. 60 of ***PM97*** that he has found evidence for three more than the four historical wheels of Gera, Draschwitz, Merseburg, and Kassel. Upon starting, each Bessler wheel was able to rapidly accelerate about its horizontal axle and then continue rotating at a constant rate for as long as was desired.

Preponderance of Evidence against Fraud

Some people nowadays are quick to just pass off, any portion of the entire body of evidence for the Bessler wheels, as fraud or a hoax but the preponderance of the evidence is against such overly-simplistic ill-informed "solutions". I believe that such naive solutions neither will stand up to the currently accumulated evidence nor will eventually pass the test of time, when modern-day inventors succeed in reinventing his wheels, using my essential instructions, which I provide here in ***MSEHNS*** and I provided in ***GWU*** for their reconstructions. My essential instructions came primarily by a decoded-translation of the steps and specifications from within Bessler's 1716/1717 publication, ***Apologi'sche Poësie und Poetische Apologie Von seinem MOBILE PER SE und PERPETUUM MOBILE***. The decoded-translation may be found within "Appendix B Orffyreus's Little Book" of my 2019 book, ***GWU***, or also within my 2019 book, ***Bessler's Little Book Decoded*** (***BLBD***), which books may both be downloaded for free near the top of https://gravityunveiled.home.blog/ to obtain pdf versions. As with the other enigmas, you may choose to delay looking at my solutions so that you may ponder a little upon the solution to the puzzle of the Bessler wheels. I hope that you delay looking at my solutions a little. I will not begin the task of presenting the extensive evidences for his wheels in terms of observations, letters, tests, and certificates, which Collins has well provided in various publications including ***PM97***.

Example Evidence of Kassel Wheel

Instead I will only state some well-verified evidence for Bessler's Kassel wheel and let others study much additional evidence especially accumulated by Collins. On pp. 16, 20, 97, and 107 of ***PM97***, Collins indicated that the Kassel wheel could continuously turn an Archimedes screw at a reduced rate of 20 revolutions per minute to pump water. On pp. 16, 20, 93, 96-97, 101, and 122 of ***PM97***, the Kassel wheel continuously turned in a sealed room for a time covering 54 days (nearly eight weeks) with only a single brief inspection stop after two weeks (12 Nov 1717 – 26 Nov 1717 – 4 Jan 1718). While running without doing external useful work, it made much noise. The massive 12-foot-diameter, 14-to-18-inches-thick wheel rotated about a horizontal axis centered on two bearings, with each being three-quarters of an inch in diameter at an unencumbered rate of 25 to 26 revolutions per minute, according to pp. 16, 20-21, 107, 108, 110, and 155 of ***PM97***. With eight

weights hitting the inside of the outer rim per revolution, according to p. 107 of ***PM97***, this meant that it would produce noise and vibration of about 3.3 to 3.5 weights hitting per second. The Kassel wheel would somehow have needed a power source to keep up that constant production of noise and vibration, while simultaneously having to overcome rotational friction attempting to slow down the wheel, whether due to air friction or due to friction in its tiny bearings.

Coded Little Book Puzzle

Bessler wrote somewhat of a preface to his coded little book puzzle. On p. 225 of ***PM97*** it says, "Those who are keen to ask questions should ask them of this little book. …" If Bessler's wheels do not provide riddles enough by themselves, his little book provides hints of needing to be decoded. His little book needed to be decoded so that it could become a huge book. Bessler intended that someone eventually would decode his little book puzzle. I think that I have decoded its most essential information.

Here is a big clue. It was well known that Bessler (Orffyreus) showed the interior of his working wheel to the eminent Karl the Landgrave of Hess Castle. See for example p. 39 or p. 89 of Collins ***PM97***. Still, on p. 296 of ***Poetica Apologia*** 2008, Bessler was quite correct in his ***Apologia*** in the beginning of his section XLVII, when he asked and answered his first question. "Has it ever come about that a person of eminence has seen the interior of my invention?" To this I answer – no. On p. 105 the first four lines of rhyming poetry in section XLVII were in Bessler's German "Die erste Frage: Obs geschehen, Und ob ein grosser Herr gesehen, Von innen das Inventum mein? Hierauf antworte ich nun Nein." See ***Poetica Apologia*** Collins' 2008 German to English translation of Bessler's 1716/1717 ***Apologi'sche Poësie und Poetische Apologie Von seinem MOBILE PER SE und PERPETUUM MOBILE***.

Long Reflective Pause is Necessary

I consider that, to avoid hastily dismissing the many wheels of Bessler without taking any serious consideration of the full matter, an especially long reflective pause is quite necessary prior to an explanation being given to those riddles provided by Bessler. Bessler was quite right when he asked, "Are ye also yet without understanding?" Bessler provided the solution specifications within his chiasm and in coded plain sight on the furthest chiastic edge of his chiastic little-book puzzle, after he asked his question in a chiastic manner. The solution was there all along in his 1717 coded symbols but first one must find it or one must figure it out. I think that I have figured it out by finding the 1717-proclaimed solution according to the many specifications, which he provided for his amazingly wonderful machine/device.

2 Enigma of Large Railroad-Efficiency

Rail Freight Miles per Gallon. In terms of miles per gallon (mpg) for efficiencies, consider that railroads can carry large amounts of delivered freight quite economically with respect to fuel consumed. On https://www.csx.com/index.cfm/about-us/responsibility/environment-and-efficiency/ I found a quote, "In 2021, CSX moved a ton of freight 533 miles on a single gallon of

fuel on average." Only the useful weight of freight moved was included. Please note that the great weight of the empty train was specifically excluded. If we were not concerned about only economically useful weight being transported, then CSX would have moved a ton of total weight much more than 533 miles on a single gallon of fuel. How can thundering, roaring, and ground-shaking freight-trains possibly have such amazing efficiencies?

3 Car Efficiency Puzzles

The URL of https://www.mpgforspeed.com/ showed a curve of mpg versus vehicle speed for average cars taken from https://fueleconomy.gov/. The mpg on that curve appeared to me to be the same for 24 miles per hour (mph) and 64 mph and the same for 44 mph and 56 mph. The regions within were increasingly "flat" regions of mpg as we go inward toward an apparent maximum value at 51 mph. There was apparently even a nearly straight line segment of increasing mpg from 27 mph to 51 mph. The URL (mpgforspeed.com) said that for most cars the optimum mpg is around 55-60 mph. The URL quoted the losses of mpg with increasing speed as follows.

With respect to the mpg at 55 mph, the mpg is 3% less at 60 mph, the mpg is 8% less at 65 mph, the mpg is 17% less at 70 mph, the mpg is 23% less at 75 mph, and the mpg is 28% less at 80 mph.

That there should be such broad somewhat "flat" regions (for 24-64 mph or even more flat for 44-56 mph) of nearly best mpg should be remarkable and is actually part of the car efficiency puzzle. Something is propping up or coming to the rescue of the values of mpg. For the sake of comparing numbers I will just focus on the unexpected loss of mpg according to greater speed.

That it should rapidly fall off with greater speed is quite reasonable given air frictional forces that should increase according to the square of the speed. What is quite remarkable is that one would expect mpg to fall off according to the square of the speed but they don't do so.

There is some sort of efficiency that is keeping mpg from going down by 1/(square of the speed). If the mpg went down by 1/(square of the speed), then the losses of mpg with increasing speed would be as follows. With respect to the mpg at 55 mph, the mpg would be 16% less at 60 mph, the mpg would be 28% less at 65 mph, the mpg would be 38% less at 70 mph, the mpg would be 46% less at 75 mph, and the mpg would be 53% less at 80 mph.

Thus the comparisons for mph losses at 60, 65, 70, 75, and 80 mph are 16>3, 28>8, 38>17, 46>23, and 53>28.

Those predicted losses due to air friction are much greater than the actual losses, according to the URL, which I stated above. Something is amazingly coming to the rescue of the mpg at the larger speeds. I consider that a strange puzzle, which would need to be solved.

First, I need to provide justification or reference that the air frictional forces increase according to the square of the speed. Next, I need to provide justification or reference that with such air frictional forces the mpg should go down by 1/(square of the speed).

Increased Air Friction

Friction is the enemy to mpg of fuel consumed, but there is something compensating in part for that increased friction. Though the full situation is complicated, only a small decrease in the mpg should be quite remarkable, given that wind/air frictional forces tend to greatly increase as speed increases. One should not downplay the importance of air friction. You can ask almost any bicycle rider about the importance of air friction with respect to going faster. Here is a simple example discussion of why air frictional forces are approximately proportional to the square of the car speed. The air friction force opposing a car's motion is the total momentum that is transferred from air to the car per unit time. That total momentum that is transferred to the car per unit of time is the opposite of the total momentum that is acquired by say initially stationary air particles per unit of time. The total momentum that is acquired by the air particles per unit of time is approximately the momentum that a single representative air particle acquires multiplied by another factor of the number of such air particles that collide per unit of time. In the second factor, the number of air particles that collide per unit of time is proportional to the speed of the car. We can argue that the first factor (of the momentum that a representative air particle acquires) also is typically proportional to the speed of the car. The momentum that an air particle acquires is its mass times its speed that is acquired, as a result of a collision with a car. That speed is roughly somewhere between zero (corresponding to no collision or interaction) and twice the speed of the car (corresponding to a full bounce back from the car). A representative value for the acquired speed is the middle value corresponding to the speed of the car. Thus, there are two factors of the car's speed in this frictional force. We thus expect that this air frictional force typically increases according to the square of the car speed.

Expected Plummeting MPG with Speed

According to this frictional force expectation, car mpg for highway driving should decrease according to the reciprocal of the square of the operating speed (or the reciprocal of the kinetic energy). See the discussion in “Appendix A Some Mathematical Details” of ***GWU*** pp. 456-457 under the topic "A.5 Decrease in Car Kinetic Energy".

4 Ranque-Hilsch Tube-Temperature Puzzles

There are puzzles that come out of the temperature differences of the Ranque-Hilsch tubes or sometimes called the Ranque tubes or the vortex tubes. There is the basic puzzle of why there should be temperature differences coming from ends of Ranque-Hilsch tubes. There is especially the curious puzzle of why those temperature differences should change as tube attitude is changed, with the maximum temperature difference corresponding to a horizontal tube attitude. One could see Fig. 30 on p. 98 of ***GWU*** for a depiction of a Ranque-Hilsch tube with a horizontal tube attitude. Tube attitude refers to the angle of the tube with respect to vertical. That drawing is similar to an abbreviated drawing on the front cover of this book, ***MSEHNS***, which also shows such a tube with a horizontal tube attitude. For a Ranque-Hilsch tube there is at least one inlet air hose that causes air to

circulate around the inside surface of the tube. Hot air comes out the end with a cone valve, which collects air from the edges. Cold air comes out the other end, which collects air from the center.

5 Coral Castle Mystery

Edward Leedskalnin (1887–1951) was the sole builder of "Rock Gate Park" or now called Coral Castle in Florida. Ed built, moved, and built more of his Rock Gate Park, for his "Sweet Sixteen". The URL of https://en.wikipedia.org/wiki/Coral_Castle contains some references to Coral Castle.

A Book in Every Home (1936) by Edward Leedskalnin contained three completely-blank pages (on both their sides) just before the inside back cover of the book, which blank pages I think Ed wanted to be blank on both their front and back sides so that readers would have additional space to write their thoughts. Long after his death the Rock Gate Park was renamed Coral Castle. Apparently so as not to waste the three bank pages, someone inserted a tiny section, "Statistics on the Coral Castle of Florida", on two right-hand/first-encountered sides of the last two of those three blank pages. That inserted section stated, "… there are approximately 1,000 tons of coral rock used in the construction of the walls and tower alone, a stupendous achievement for one man, unequalled in all history. In addition over 100 tons of coral rock were used in the carvings of the artistic objects …" The heaviest rock at Coral Castle weighed 29 tons.

Decode *"A Book in Every Home"*

If his Rock Gate Park or Coral Castle is not enough of a mystery by itself, his book, ***A Book in Every Home***, was especially a mystery. In hindsight, it should be quite clear that Edward Leedskalnin wanted his little book decoded, since he wrote almost exclusively only on the left hand sides of his book. Nearly all the right-hand/first-encountered sides of his book were blank; the only exceptions were his front cover, his preface, and his inside back cover. In his preface he wrote, "… if for any reason you do not like the things I say in this little book, I left just as much space as I used, so you can write your own opinion opposite it and see if you can do better…" Yes, he clearly wanted someone to decode it. I think that I have decoded his little book and you can have a free decoded version of his little book (at my blog site within pdf downloaded books ***GWU*** or ***BEHD***). I suggest that you ponder a little on the situation before reading my solution to the enigma. Upon being decoded, his greatly-symbolic little book expands into an ever-expanding huge book and resolves the mystery of how he built his Rock Gate Park. When the time would be right for the benefit of all people, Ed wanted future generations to know the most essential information, regarding how he built his greatly-symbolic Rock Gate Park.

6 Sun Energy Puzzle

Does Sun Get Energy from Hot Fusion? We get light from the sun on a daily basis, but where does the sun's energy or power actually come from? Because of a previously perceived apparent lack of alternatives, many had simply assumed that the sun obtains its energy from deep inside the sun by nuclear fusion. What else could it be? It has often been stated or taken as a given that the energy for the sun and the stars comes from fusion of lighter nuclei to form heavier nuclei. Such

thermonuclear reactions or hot fusion reactions of light nuclei into heavier nuclei, with large binding energies, would release those large binding energies in the process. While such processes are possible, do the bare facts support the idea of the sun obtaining its primary energy from hot fusion? The typically unstable hot fusion process needs some combination of high densities and high temperatures for long enough times for the repulsive positively-charged nuclei to combine and cause hot fusion to occur. If the sun obtained its energy from hot fusion reactions deep down inside the sun, where conditions were best for such reactions, then the energy released from hot fusion reactions would be greatest there, and the temperatures would be greater when deeper down within the sun and the least exposed to the super-cold 3° Kelvin background temperature of the surrounding space.

Sun Temperatures Incompatible with Hot Fusion Source

What is actually observed, according to radiations from the sun, is exactly the opposite. Sunspots form windows through the 100 kilometers thick photosphere a little way down into the interior of the sun. According to observed light coming from those sunspots, all the sunspots are somewhat deeper, cooler, and darker than the photosphere. It is not reasonable that the supposedly great heat coming out from the depths of the sun always-completely avoids the cooler regions of the sunspots as the great heat makes its way out from the supposedly immensely-high-temperature center of the sun. As elevations on the sun increase, there is an actual increase in the temperatures associated with radiations coming from the sun's atmosphere completely contrary to any hot fusion explanation. The sun is not getting its energy from nuclear fusion reactions deep down inside the sun, so there remains a puzzle-question of "Where does the sun actually get its radiant energy/power?"

7 Satellites Tumbling Puzzles

Satellites have long been known to begin tumbling if means are not provided to prevent them from tumbling. Once some satellites begin to tumble, they can progress to tumbling out of control, to greater and greater angular speeds. One might attempt to attribute a portion of the tumbling to the gradient of the atmosphere. The lower part of the satellite might be slightly grabbed more by the slightest atmosphere. Does the data only support this type of tumbling? No. They don't just tumble increasingly in that direction according to atmosphere grabbing. The following is an example of studies considered for determining why satellites tumble.

The report "Spacecraft Radiation Torques" by NASA in Oct 1969 (http://www.dept.aoe.vt.edu/~cdhall/courses/aoe4065/NASADesignSPs/sp8027.pdf) studied the effect of radiation on causing satellites to tumble. On p. 1, the Introduction begins with, "In the design of spacecraft attitude-control systems, all torques that tend to disturb the attitude of a spacecraft must be considered." For people wanting to study all torques, they must have been perplexed about exactly why some satellites tumble. They used the best information and physics they had to analyze various situations. They considered evidence for radiation torques and

made recommendations. Still, I think that the unstated question remained of why some satellites tumble increasingly out of control.

8 Earth Temperature Puzzle

See pp. 86-88 of ***GWU*** for my prior discussion and calculations under "Planet Completely Surrounded by Cold Space and Sun". Though that was previously done for all the planets, I will now only write regarding the earth's temperature puzzle.

Earth's Equilibrium Temperature

As much time goes by, what would happen with respect to temperature of this earth, if it had very little sources of internal power? It is a very large distance from the bright sun and the earth is otherwise essentially directionally-surrounded by space, having an extremely cold background temperature of space of 3°-Kelvin? I think that as the earth loses any original heat and assuming little internal sources of energy its surface would slowly approach the average temperature of slightly above 3° Kelvin (in all directions from the earth including the 6000°-Kelvin-temperature of the sun). That assumes that the zeroth law of thermodynamics is actually correct and that the earth eventually attains the average temperature of its directional boundaries, according to its thermal boundary conditions. That analysis based on the zeroth law of thermodynamics automatically includes such details as radiation from the sun to the earth, radiation from space to the earth, and radiation from the earth to its surroundings. There is also very little evidence of vast amounts of heat flowing out from the interior of the earth to keep its surface warm to counter the effects of its thermal direction boundaries. The ocean depths are generally cold and the permafrost portions had long been frozen.

Earth's Average Surrounding Temperature

We can find the average temperature across all surrounding directions, by associating each direction with an area on a sphere about the earth, which is a distance D corresponding to the distance from the earth to the sun. The area on the surface of a sphere of radius D is $S = 4\pi D^2 = 4\pi D*D$. The symbol "*" represents times or multiplication. The area of a circle of radius s is $A = \pi s^2 = \pi s*s$. Assume the radius of the sun's photosphere is "s". The directional temperature of the sun is approximately 6000° Kelvin. We could calculate the average directional temperature, "T", in all directions from the earth. We can assign a directional temperature of 3° Kelvin to almost all places on the surface ($4\pi*D*D$) of the sphere except for an area corresponding to the area presented by the sun ($\pi*s*s$). That means on that large sphere of radius D, there would be a directional temperature of 3° Kelvin assigned to an area of $4\pi*D*D - \pi*s*s$. On that large sphere of radius D, there would be a directional temperature of 6000°K assigned to only an area of $\pi*s*s$. The sum of those two areas is $4\pi*D*D$. Then, using those two areas on the sphere of radius D about the earth, we can do an area weighted averaging of those directional temperatures, according to Eq. 8.1 below, to find the average directional temperature, "T", on the surface of that sphere. The radius of the photosphere of the Sun (Sol) is s = 695950 kilometers according to p. F-146 of the 52nd Edition ***CRC Handbook of Chemistry and Physics*** (***CRC***). It is not important that the most accurate or the latest values be used. Representative values are more than

adequate for my calculations and discussions. The value for D = $1.4957*10^8$ kilometers was taken from the Earth's semimajor axis of revolution on p. F-147 of ***CRC***. The distances (s and D) and the directional temperatures (3° Kelvin and 6000° Kelvin) are not exact but are treated in the calculations as being exact, so that one can see how the calculation of T compares to the background temperature of space. Thus for the earth being a distance D from the sun, then T = the average surrounding temperature on the directional sphere from the earth would be T = 3.032459449° Kelvin. The average directional temperature for that sphere surrounding the earth, "T", is very close to the background temperature of space but upon rounding it would be 3° Kelvin. That average directional temperature, T = 3° Kelvin, would be approximately the eventual average equilibrium temperature of the earth, assuming that the earth has no internal power source. Water freezes at 0° Celsius, which is 32° Fahrenheit, which is 273.15° Kelvin. A temperature of 3° Kelvin is so cold that it would cause helium to become a liquid. It would cause its atmosphere to freeze (except for its helium) and its oceans to also be frozen. Even if the earth had a slight internal power source such cold surroundings would cause the earth to be a frozen ice ball.

(8.1) $T = \{6000°K*\pi*s*s + 3°K*(4\pi*D*D - \pi*s*s)\}/\{4\pi*D*D\}$

Some might say that I have specifically ignored the intensity of the solar radiation by simply assuming the sun was effectively a blackbody at approximately 6000°K, which it is approximately except for some slight deviations at the highest energy photons. I would respond that the solar radiation is only part of the overall external interactions. There are many external interactions with the very cold background of space, such as radiation sent out to space and reception of radiation from space. I wanted to effectively include all the external interactions. To only consider the radiation coming from the sun would have been quite improper. That is why I did the thermal-boundary directional-averaging analysis as I did above, under the assumption that the earth environment has no internal heating source of its own. The assumption of no power source for the earth is not quite correct. We would need to slightly modify the analysis to include internal sources of heat for the earth but the earth would still be a frozen ice ball.

Radiation Sent/Received. To get a clue about the interactions between the radiation to cold space and the radiation from cold space, you may consider my @Alden_Park GETTR post of 25 Jan 2022. I had a small plastic bowl of water resting on a saucer down within a large stainless steel bowl that I previously placed on top of a tall ladder in my backyard in Fresno, California. I used the ladder so that hopefully no part of the water "sees" other objects than the sky (and cold space beyond it) or rather that no part of the water receives radiation from other objects except for the sky (and cold space beyond it). The water was roughly at the focal "point" of radiation from the sky and beyond. A portion of the water was frozen (about 32° Fahrenheit) at 6:47 AM on the morning of 25 Jan 2022 after a clear night, even though the background temperature was 38° Fahrenheit. I didn't notice any breeze that might have supplied some evaporative cooling. There was no frost on the grass, weeds, and plants left over from it supposedly being colder earlier.

The large stainless steel bowl would have provided some shielding from breezes. There was 6° Fahrenheit of cooling. More radiation was sent out toward the sky (and cold space beyond it) from the water than the water received from the sky (and cold space beyond it). Doing the boundary directional-temperature analysis avoided a multitude of tricky radiation calculations and analyses across all directions about the earth.

Greenhouse Effect

Someone might say that it is the greenhouse effect, as caused by the atmosphere, which keeps our earth from freezing. The greenhouse effect would be completely ineffective, if the atmosphere were subjected to temperatures anywhere near 3° Kelvin. The atmosphere would relatively quickly either be frozen or become a liquid. So much for the greenhouse effect. The puzzle/enigma question remains of why this earth isn't a frozen ice ball. Can you think of a solution? You might be able to think of the solution, if you think very carefully about it.

Other Heat Sources

Some people would say that earth has much original heat and an internal heat source in part provided by the decay of radioactive materials within the earth. Also, nuclear fission and tidal forces contribute slightly to the heating within the earth. While those things may are correct, do we see much heat arising from the interior? In a few cases we do see volcanos, hot springs, and heat vents within the oceans, but these things are relatively rare. Should we suppose that any great heat, working its way out of the earth's interior, always just managed to skip the large regions of permafrost? From the above analysis, I think that the earth should be quite frozen even with some slight internal heat sources, slightly modifying the thermal boundary analysis. Why isn't this earth actually frozen? What was left out of the analysis, since the earth is not a frozen ice ball?

9 Solar Corona Mystery

The outside portion of the sun is exposed in nearly all directions to the background temperature of space, which is about 3° K = three degrees Kelvin (or about a degree colder than the ultra-cold temperature at which helium gas becomes a liquid). Such cold temperatures should cause the portions of the sun that are the most exposed to the ultra-cold background temperature of space to have the coldest temperatures. That doesn't happen.

Energetic Photons Where Most Isolated

As elevations on the sun increase, there is an increase in the temperatures associated with radiations coming from the sun's atmosphere. As elevations on the sun increase, atoms/ions/nuclei are less likely to collide/interfere/interact with other atoms/ions/nuclei. The edges of the solar atmosphere emit radiations (in all directions) that correspond to ultra-high temperatures near 1,000,000° K = one million degrees Kelvin. The furthest edges of the sun's atmosphere (with the least interactions) emit radiations that correspond to temperatures near 10,000,000° K = ten million degrees Kelvin. The temperatures correspond to the best-matching shape of blackbody photon-radiation spectra. Such photons are so few in numbers that their observations need to be made during total solar eclipses (when the solar

corona is visible to instruments) so as not to be overwhelmed by the many photons of much lower energy coming from the intense photosphere. Still, those few mysterious, individual photons from the solar corona are quite energetic.

Separate Temperature?

Someone might counter that the atoms/ions at the far edges of the sun's atmosphere are very small in speed with respect to translational motions associated with such temperatures. That "counter argument" (1) almost requires a separate sort of temperature not consistent with the zeroth law of thermodynamics, (2) leaves unexplained the mysterious individually-energetic photons of the solar corona, and (3) ignores the entire idea that the actual temperatures measured coming from the sun increase as elevation increases. The fundamental evidence (that the temperatures on the sun drastically increase with elevation) is in direct conflict with the idea that having more exposure to the ultra-cold background temperature of space should correspond to colder temperatures. As elevation increases, a measured temperatures decrease is just not observed. The exact opposite is mysteriously observed.

10 Mystery of McKinley Low-Friction Demonstration

For background information, see sections "My Memories of McKinley Low Friction Demonstration" on pp. 139-141 and "Some Memories of Others" on pp. 141-142 of ***GWU***.

Wheel from Ultra-low Friction Bearing

The low-friction demonstration, in the cafeteria at McKinley Junior High School in Albuquerque, New Mexico during the spring of 1968, appeared to show what actually happened when an ultra-low-friction bearing was created. It was approximately a six-foot-diameter wheel apparently made of a thin black-plastic. The wheel self-started after the bearing was formed with a wobble. It increased in angular speed until it reached a steady angular speed of somewhere between 20 and 50 revolutions per minute, around a horizontal axis. The most likely angular speed may have been the middle value of 35 revolutions per minute. It could be observed after school for as long as the students cared to watch it rotate in a counterclockwise direction. Its south face was viewed by the students watching from the south end of the cafeteria as they looked north at it. Apparently the bearing was created after liquid helium was added to cause lead to become superconducting so that it would exclude all the magnetic fields coming from a magnetic axle (or rather a magnet covered axle), according to the Meissner-Ochsenfeld (1933) effect. The ultra-low friction bearing was formed, as the wheel's hidden magnetic axle was levitated. The wheel had single-level radial ridges, with inset colors between them, on the visible face of the wheel. The ridges threw air outward and apparently caused the wheel to not rotate more rapidly. There remained a mystery of why the wheel increased in its rotational speed until it reached a steady angular speed.

High-tech Bessler Wheel

It would seem to be a modern-day high-tech variant of a Bessler wheel, with the exceptions that (1) it was completely self-starting from rest upon the bearing being formed, (2) its weight appeared to be much less than any of Bessler's wheels, (3) the

bearing was only on one side of the wheel (or in the middle with a hidden rotating balancing-weight on the other side, instead of Bessler's four most famous wheels which were each located between a pair of mechanical bearings), and (4) it may have only keep rotating as long as the lead (below the magnetic axle) is kept at approximately liquid helium temperatures but there is no currently available data concerning how the experiment ended. I suspect that when all the students viewing the demonstrated left the cafeteria, the presenters manually stopped the wheel. I stayed watching the rotating wheel for at least 15 minutes but it may have been closer to at least 30 or 45 minutes, since I was one of the last people to leave the demonstration.

No Replication Experiments Attempted

I have heard of no attempts since 1968 to do similar experiments. In case someone is interested in doing experiments to consider phenomena related to the McKinley low-friction demonstration, they should see the section "Replicating McKinley Ultra-low-friction Bearing" on pp. 142-146 of ***GWU***. See Figs. 37 and 38 on pp. 144 and 146 of ***GWU*** for suggested drawings that one might consider when doing such experiments. Given the high current cost of liquid helium, small experimental attempts to qualitatively replicate the demonstration should cost much less money than any attempt, to more completely replicate the full-size demonstration.

11 Papp Engine Enigmas

Josef or Joseph Papp Jr. (21 Apr 1933 – 13 Apr 1989) invented engines, which ran, without any sources of normal fuel for combustion. Papp is pronounced "pop", according to the usual European vowel convention. He claimed to reuse a mixture of noble gases to power his engines. On 27 October 1968, he demonstrated greater than chemical power, when there was an explosive test of a tiny amount of his gas, which gas he normally would use to run his engines. For more information, see ***Infinite Energy*** (***IE***), 2003, Volume 9, Issue #51, pp. 7, 17, 37-40, 43. Then on 18 November 1968, Papp demonstrated one of his noble gas engines. An uninvited physicist, Dr. Richard Feynman, interfered with the demonstration by unplugging a cord running to the demonstration. He apparently figured that he would just wait for the battery in the so-called "perpetual motion" demonstration to run down. The engine ran rough but never did stop running. Papp figured out that the unplugged cord was the source of the problem of his engine running rough. People were warned to get back, when the cord was plugged back in. There was an explosion and one person was killed. During a follow-on investigation there was no evidence of any explosive chemicals being present. The Papp engines apparently normally ran cold. See more details in ***IE*** Issue #51, pp. 7-8, 29-30, 33-36, and 39-48.

Papp Patents

The Papp patents (#3680431, #3670494, and #4428193) describe portions of his engines. These two questions need to be answered, "How did the Papp engines 'perpetually' run, using reusable seemingly-noble-gases?" and "What gave Papp's 'noble gas' greater than chemical power during the onetime explosion, on 27 October 1968?"

12 Cold-Fusion Energy-Production Mysteries

For the seminal "cold fusion" paper, see "Electrochemically induced nuclear fusion of deuterium" by Martin Fleischmann, Stanley Pons, and Marvin Hawkins, J. Electroanal. Chem., Vol. 261, No. 2A, April 10,1989, pp. 301-308; Errata, Vol. 263, No. 1, May 10, 1989, pp. 187-188. What are the root explanations for cold fusion or Chemically Assisted Nuclear Reactions (CANR) or Low Energy Nuclear Reactions (LENR) or related nuclear effects? This broad field has encompassed a wide variety of phenomena and devices. There have been a variety of attempted explanations for particular cold fusion phenomena and devices. I will attempt to provide a method for explanations/solutions, which tries to cover the entire large body of phenomena and devices. Can you guess the solution method?

13 Jupiter-Saturn Excess-Radiation Puzzles

Both Jupiter and Saturn emit excess radiation or rather more radiation than they receive from the sun. I don't think that one can reasonably explain such excess radiation due to processes of either (1) nuclear reactions or (2) gravitational contraction or (3) radioactive decays. See https://en.wikipedia.org/wiki/Jupiter for references relating to thermal radiation that is produced in the atmosphere of Jupiter. See https://en.wikipedia.org/wiki/Saturn for references relating to thermal radiation that is produced in the atmosphere of Saturn. We should not exclude from consideration any furthest portions of those atmospheres, assuming that the energetic magnetic particles are not swept away by orbiting bodies.

(1) Not from Nuclear Reactions

The reaction of nuclear fission, if left by itself, is normally an unstable sort of process, which usually rapidly decreases. There is no indication that the excess power comes from the unstable process as nuclear fission. Saturn has much less mass (about .000285 = 5.684/19910 for masses in units of 10^{26}kg, using information from p. F-146 of ***CRC***) than the sun. With Saturn having much less mass than the sun and with Saturn having much less compression than the sun, it is not reasonable that Saturn, by means of the greatly unstable process of nuclear fusion can stably radiate 2.5 times the power that it receives from the sun. Jupiter has more mass (about 3.34 = 19.01/5.684, using information from p. F-146 of ***CRC***) than Saturn. That is not enough to account for its excess radiated power as coming from that very unstable process of nuclear fusion. The sun has about one thousand (or about 1050 = 19910/19.01, using information from p. F-146 of ***CRC***) times the mass of Jupiter.

(2) Not from Gravitational Contraction

There has been no evidence, according to measured shrinking sizes, that gravitational contraction can account for the excess radiation being emitted by those planets.

(3) Not from Radioactive Decays

Radiation of long lifetime radioactive materials could in principle provide a fairly stable source of power (though slowly decreasing with time) but I think it is unreasonable that it would account for the large amounts of excess emitted radiation coming from both those planets.

More Radiation Puzzles

Even if someone insists that one of these "explanations" is sufficient to explain the excess radiations observed coming from one of those planets, such an explanation would fail at explaining why those radiations can increase in individual energies, as elevation increases on those planets, despite more exposure to the ultra-cold background temperature of space. We should not exclude the energetic radiations, which can occur at high elevations within radiation belts, even when the radiations occur within the sun's shadow, assuming that the energetic magnetic particles are not being swept away by orbiting bodies. We must not exclude anomalies using separate categories for the purpose of ignoring trends. For example, we should not exclude higher elevation phenomena by putting them into separate categories so as to hide elevation dependent trends for energetically productive materials. I think these remarks leave us with the strange puzzles of how both Jupiter and Saturn can emit such unusual excess radiation. As I have been similarly doing with other enigmas, I will let you have time to think about the puzzles before I try to provide an explanation, which common explanation I think works for both planets.

14 GEET-Reactor Energy-Production Curiosities

GEET Reactor Overview. Paul Pantone invented the GEET reactor. Paul Pantone obtained patent #5,794,601, which was filed on 16 May 1997, with patent date of 18 Aug 1998 (which one can see at https://www.freepatentsonline.com/5794601.pdf). GEET stands for Global Environmental Energy Technology.

Early Pantone Demonstration

See https://www.youtube.com/watch?v=d5YsK3bwzPM "Paul Pantone Plasma Reactor Motor" Oct 29, 2006 to see a video of an earlier demonstration by Paul Pantone of his GEET fuel processor. Since his earlier demonstration, I understand that he has advocated not using the engine exhaust to bubble, through the input liquid fuel, so that the input fuel vapor remains cool. The cool input fuel vapor to the reactor helps the GEET reactor to work better.

Free License Plans

A variant of the GEET reactor free license plans (for educational, personal, and non-commercial use for a single engine of less than 20 horsepower) may be found at the URL on http://www.teslatech.info/ttstore/articles/geet/geet.htm (which shows an enlarged diagram http://www.teslatech.info/ttstore/articles/geet/jnldwg.htm). Because Pantone made such free licenses available, this greatly increased interest in such devices. The original free plans had some inefficiency, solved by the above mentioned need to have a cool input vapor to the GEET reactor. If there is a separate external means available for cooling the exhaust vapor, then one could pass that cooled vapor through the bubbler to reuse the fuel and thus improve fuel economy.

Hookups

A discussion for hooking up the fuel processor is found on https://www.youtube.com/watch?v=VMWWScFyjH0&NR=1 "GEET Fuel Processor -

test 4 - revelation" but there is much other information on the Internet about interfacing different types of GEET reactors to engines.

Some Later GEET Presentations

See https://www.youtube.com/watch?v=WH50tJyY4YE "GEET Reactor a video by Paul Pantone" Apr 19, 2020 for "The GEET Reactor System for Small Engines", where a workshop instructor provided the presentations: Bubblers, Reaction Chamber, and Air Management.

GEET Reactors Pretreat Alternate Fuels

The GEET reactors pretreat alternate fuels. The GEET reactors are curiosities or puzzles regarding where the energy comes from for conversion of the alternate fuels into fuels. Seemingly engine exhaust supplies some heat energy to the fuels but that would seem to be a partial or inadequate explanation given that more energy is produced, when the input fuel vapors are cooler. I think that there is much more to the story than meets the eye. How can the coaxial rod be suspended magnetically within the center of each working GEET reactor tube (or volatilization chamber)? What creates the plasma therein to rip molecules apart, as the new fuel is produced? I will try to provide solutions to such questions. The process in each GEET reactor needs some basic explanation of what is actually going on for it to function.

15 Puzzle of Magnetic Motor of Muammer Yildiz

Demonstration of Magnetic Motor of Muammer Yildiz

See the example video at https://www.youtube.com/watch?v=mHW6b1aFPfU, "Motor powered with neodymium rare earth magnets" (20 Apr 2010, 7 Aug 2012) for a demonstration of the magnetic motor rotating about a horizontal axis. The magnets for the motor were assembled in sections. The problem of stray external magnetic fields appears to have been sufficiently solved. I think that Muammer Yildiz needs to be credited with an amazing invention. The demonstration showed that the motor of Muammer Yildiz was a perpetual source of power. It was a perpetual motion device. Upon being started, it could perpetually run a fan, which would blow air. The puzzle or question is, "How is the magnetic motor a sustained source of power?"

Magnetic Motor Patent

Regarding a patent for the device having an arrangement of magnets of Muammer Yildiz, see https://patents.google.com/patent/WO2009019001A3/en , which among other things shows an application number of DE102007037186A with a filing date of 2007-08-07. The abstract did not seem to address how the energy is obtained. I think that people will need to consider my explanation of where the power comes from.

SOME IDEAS FOR SOLUTIONS TO ENIGMAS

Did you consider or ponder upon explanations for some of those previously described scientific enigmas or puzzles or riddles or mysteries or curiosities or problems? I hope that you did do some careful consideration of the many puzzles.

Did you see any commonalities within the puzzles? Are there simple partial solutions to some of those scientific puzzles? Could there be common solutions to some of these puzzles? I think that the Bessler principle is an important yet unrecognized scientific principle, which you should consider.

Simple Explanation of Bessler Principle

I suppose that my https://gravity-wheel.neocities.org/ site simply explains the Bessler principle according to the three following paragraphs, which I show here slightly modified.

Smallest Building Blocks of All Matter. Imagine that there are many extremely fine opposite charges within matter that are equally massive and are equal in charge magnitude. They would be the basis or "building blocks" of all matter. One could call these finest or most fundamental opposite-charges by the name of spirit matter to be consistent with the scriptures. A proton would have excess finest fundamental positive charges, making it net positively charged. An electron would have excess finest fundamental negative charges, making it net negatively charged. A neutron would have equal numbers of the opposite finest fundamental charges so it would be neutral with respect to charge.

What Might Gravity Be? A graviton of gravity, say from down within the earth, could on rare occasion come from a pair of discrete electric fields traveling quite precisely together in exactly the same direction from a pair of opposite finest fundamental charges. The two fields could travel together as a special pair, until conditions are just right so that both discrete electric fields are absorbed by attractive pulls down on finest-fundamental opposite-charges. A smallest bit of gravity has two equal pulldowns with the lower elevation pulldown almost always being applied first. The lower elevation charge is the charge that is typically encountered first. The two separate downward pulls are applied at separate times and places. Since the pulls down are on such a fine scale, the separate times and places of the downward pulls would not matter much (with respect to providing rotation to a stationary body), until we consider them pulling down on matter which initially happened to be rotating about a horizontal axis.

Bessler Principle. Whenever a wheel of any size rotates about a horizontal axis, the nuclei within it internally rotate around each center of mass at about the same rate. The pairs of finest fundamental charges also internally rotate about their center of mass at approximately that same rate. Below in Figs. 1, 2, and 3 (and also on the back cover), in the order of increasing time for counterclockwise rotations are the same images corresponding to Figs. 25, 26, and 27 on pp. 69-70 of ***GWU***. Each image shows two separate pulls down impulses by gravity, on two finest oppositely-charged particles rotating about their center of mass. The solid lines show where the two particles are earlier on. The dashed lines show where the two particles are later on. There would be a later pull down by gravity at a higher elevation. Many of these situations would tend to cause an increase in angular speed, though we often don't see it because of rotational friction or because of low angular speed about a horizontal axis. You can just try to imagine that you are looking at some separate nearly-consecutive frames of a movie, with each image

being two frames. I call this idea, of increase in angular speed, the Bessler principle (***GWU*** pp. 24, 67-72, 75-76, 155-157), since as far as I am aware Bessler was the first named person, who was associated with the phenomena or physical principle. Extra rotational kinetic energy is produced from gravity, under these special conditions. I think that the Bessler principle can explain many things related to rotations about horizontal axes.

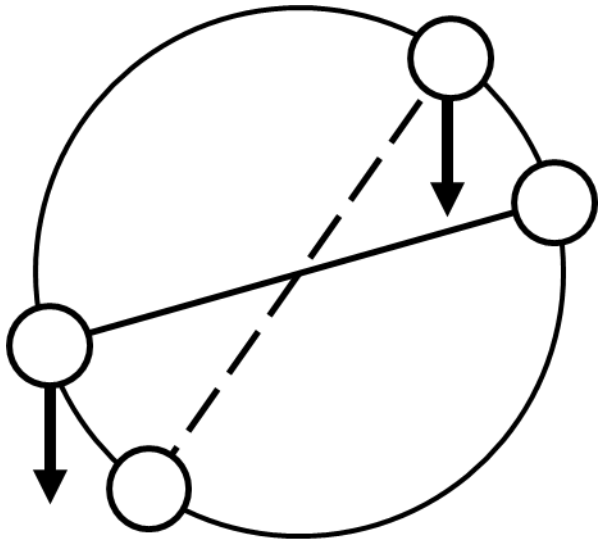


Fig. 1. Illustration of left-right pulls for Bessler principle.

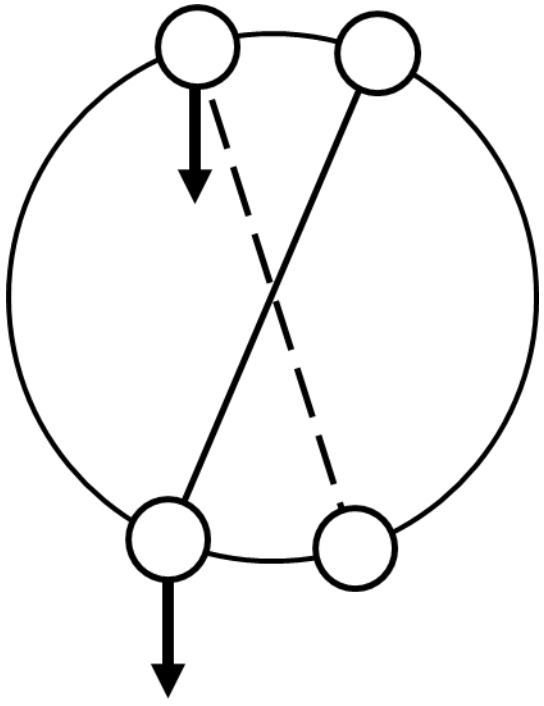


Fig. 2. Illustration of left-left pulls for Bessler principle.

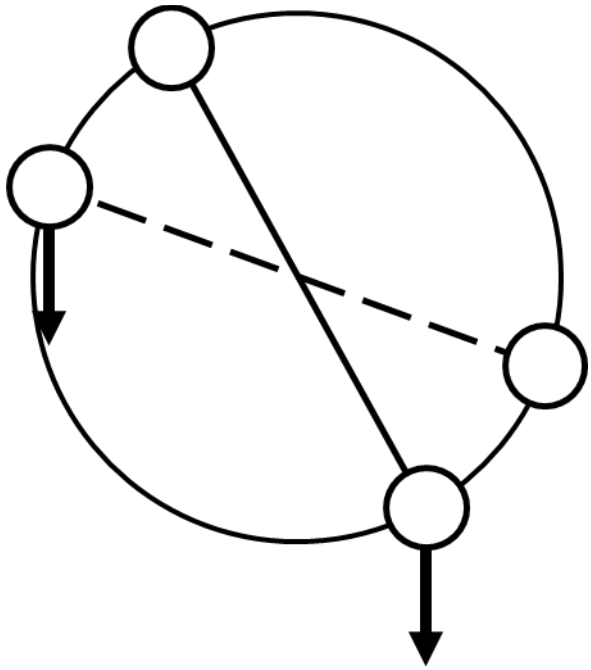


Fig. 3. Illustration of right-left pulls for Bessler principle.

Alternate Statements of Bessler Principle

The book ***GWU*** on pp. 68-71 contains three alternate statements of the Bessler principle from different viewpoints. A macro statement of the Bessler principle is "In the absence of friction, a wheel rotating about a horizontal axis acquires *rotational kinetic energy* with respect to the horizontal axis through its center of mass from the absorption of two-part gravitons from below." An unveiled micro statement of the Bessler principle is "In the absence of friction, two opposite fundamental charges initially rotating about an axis through their center of mass will often upon their absorbing a non-axial direction graviton have an increased rotational speed or *rotational kinetic energy* about the parallel axis through their new center of mass." Figs. 1-3 illustrate that micro statement. A simple power statement of the Bessler principle is "Any wheel rotating about a horizontal axis receives internal power." The Bessler principle is a part of an attempted discrete theory of everything discussed in ***GWU*** on pp. 320-329, 412-415, and 458-469.

Self-suppression of Bessler Principle

The Bessler principle carries its own self-suppression because of its invocation conditions. It little occurs when there is little angular speed. Friction masks the phenomena and removes power obtained by it. The Bessler principle is also self-suppressed, when there are poor connections between the nuclei and their surrounding lattice connections. Those lattice connections with surrounding wheels can be damaged when the principle is overly used by very rapid rotations of large wheels. Those poor/damaged connections reduce both the ability of nuclei to be caused to rotate within a wheel (by the nuclei not rotating as rapidly as they should) and then the ability of the nuclei to communicate the acquired rotational

kinetic energy back to the surrounding wheel. The Bessler principle is self-suppressed if there is little matter available for it being acted upon. The Bessler principle is self-suppressed when there is little gravity available. The Bessler principle is self-suppressed when the available rotational axis is vertical with respect to the available gravity. See ***GWU*** pp. 25-26 and 30-32. We can see that not all the suppression comes from external bias against it but much of the suppression is native to its occurrence. There has been much external or popular bias against it.

Bessler Principle Restrictions. Besides wheel angular speed, gravity direction, and gravity strength, we see that there are various ideas or principles related to the use or restriction of the Bessler principle.

Graviton Composition. A part of the Bessler principle is the idea or principle that there are two discrete or attractive impulses associated with each graviton. The two discrete electric fields in a graviton will each pull down attractively on the most fundamental charge opposite to the most fundamental charge that it originated from.

Bessler Principle Restriction. Associated with ED.L. (symbolically depicting his device and also meaning "Energy from Delayed Leveraging by gravity" or briefly "Energy from Delayed Leveraging"), which is Leedskalnin's version of the Bessler principle, is the idea or principle that any wheel rotating too rapidly about a horizontal axis will destroy/degrade the lattice connections with the contained nuclei. Such a wheel is no longer sweet (in Ed Leedskalnin's language) or no longer rotationally new. Wheel rotational history can be an important concern regarding the Bessler principle.

Perpetual Motion Devices using Gravity?

Without an external source of power except gravity, is a perpetual motion device possible? I suppose that may depend upon the answer to the following question. Does gravity count as an external source of power? I say that gravity is an external source of power so that it can produce a perpetual motion device. Many people have said that gravity is a conservative field, which cannot impart net energy to any single smallest neutral bit of matter, whose center travels a closed path. They say that gravity is not an external source of power, so it cannot produce a perpetual motion device. See ***GWU*** pp. 452-456, where I pointed out four holes in the traditional energy conservative analysis. The standard analysis doesn't consider or rather ignores the rotational kinetic energy intrinsically imparted to the single smallest bit of possibly initially rotating-neutral-matter, whose center travels a closed path, during which there are many cases of two separate pulls-down by each discrete graviton. I think that such situations can sometimes produce perpetual motion devices. The standard analysis considers the Bessler principle to be impossible so it can't produce a perpetual motion device. I think that the final decision depends on such things as much data, further experiments, and much scientific analysis/study of results. Let us consider some of my analysis/study of much data/results.

SOLUTIONS OF ABOVE SCIENTIFIC ENIGMAS

From here on to the section "Afterword" is considered the last part of this book. The solutions are presented in reverse order, as we do our countdown. The last stated enigma will be explained first and the first stated enigma will be explained last. If you must refer to an earlier discussion, you could use an extra copy of the pdf. Hopefully, you will have given considerable thought to the situations so that you will have made or will try to make good attempts at solutions, neither abruptly rejecting the enigmas nor abruptly rejecting possible modes for solutions.

15~ Explanation of Magnetic Motor of Muammer Yildiz

Magnetic Bearing. Based on my studies, I have my own explanation of why/how his invention received his sustained power. I think that Muammer Yildiz built a clever magnetic bearing with very low friction, which after being started would for example allow a fan attached to the rotor to "perpetually" rotate providing a source of "perpetual" power. It was called a magnetic motor but rather than the power coming from magnetics, I think that the magnetics supplied low enough friction so that the actual source of power came from the Bessler principle. As the rotor rotated about a horizontal axis it acquired power from the delays of higher elevation absorption-parts of the two-part gravitons, according to the Bessler principle. The Bessler principle provides more power when the angular speed is larger. The magnetic motor of Yildiz was given an initial rapid angular speed to get it to produce power. More power was received from the Bessler principle than was removed by the magnetic bearing, which allowed some extra power to be provided to the fan so that the system was at equilibrium. For my prior discussion, see pp. 429-430 of ***GWU***. I consider that the Yildiz motor is a gravity-powered perpetual motion device. The perpetual power production by Yildiz motors gives much evidence for the Bessler principle.

Some of My Suggestions

Here are some of my suggestions regarding similar "magnetic motors".

1. Increasing the mass of the rotor would increase the power produced (for the same angular speed and friction) as long as the carrying capability of the magnetic bearing is neither overwhelmed nor overly stressed. Any extra rotating mass must not be so large in mass that it causes vibration or motor friction or rubbing within the motor.
2. Any rotor must not be composed of material that had previously been rotated too rapidly about a horizontal axis. One would need to somehow remove sufficient power produced so that the rotor never rotates too rapidly.
3. One must also not remove so much power that the rotor stops rotating because of the Bessler principle generating insufficient power due to low angular speed. Minimizing air frictional forces would be useful by keeping any added rotor mass as compact and as near its rotational axis as possible.

14~ Explanation of GEET-Reactor Energy-Production Curiosities

Simple GEET. Here is a brief explanation of how I think that GEET reactors work. Many GEET reactors break up molecules by means of collisions of rapidly rotating vaporous materials previously caused to rotate rapidly about internal horizontal axes, with the internal rotations increased by means of the Bessler principle. The locally smooth inner surfaces of containing cylinders, in the presence of magnetic fields, initially allow bouncing/rolling gaseous molecules to use the Bessler principle to later rotationally destroy them within GEET reactor plasmas. See ***GWU*** "GEET Reactors" on pp. 176-198 for an earlier discussion of why the GEET reactor works according to the Bessler principle. I will cover "GEET Basic Theory" below, according to my current understanding. If you don't want a more detailed explanation of the GEET reactor, then you can just go to the explanation of the next enigma "13~ Explanation of Jupiter-Saturn Excess-Radiation Puzzles". The break-up of molecules by many GEET reactors gives much evidence for the Bessler principle.

Attempted Explanation of GEET Reactor

Here is an example video (https://www.youtube.com/watch?v=K1mnfp1tDAY "GEET Plasma Reactor - Science Explained" Dec 23, 2016) which I thought was a reasonable prior attempt at overview explaining the science of the GEET reactor. Still, I think that we should not reuse the exhaust unless we can make quite sure that the reused exhaust is first cooled so that the input fuel is kept cool. I will next explain why cooling it first is important. I think that I can better explain why the plasma occurs early alongside a portion of the floating reactor rod. The video didn't speak of the essential connections using the Bessler principle.

Keep Input Fuel Vapor Cool

I think that Paul Pantone made some comments about not heating the fuel prior to delivery. I take his comment to mean that we don't want to have hot vapor going into the entrance of the GEET reactor processor. We don't want the vapor to go too fast through the GEET reactor. We want it to translationally linger in the forward direction of the GEET reactor so that it can better rotationally interact. The vapor being translationally cool would better encourage nuclei/atoms/molecules to rotate more about horizontal axes by initially more rotational contact with the inner cylinder surface of the GEET reactor. Hot gas would more quickly pass through the GEET reactor, without being caused to rotate about horizontal axes, around their molecular centers. Rotating molecules very rapidly around internal axes in the presence of plasmas, with both plasmas and rotations caused by the Bessler principle, would break up those molecules.

GEET Tips

There are many tips out on the Internet so one might want to do some study prior to constructing a GEET reactor. See the video https://www.youtube.com/watch?v=0ILZrLGsBns "GEET Reactor Construction Details" Mar 7, 2013 of Naresh Vasant's earlier 10 August 2008 video. The video provides essential construction steps such as warning against weld ridges blocking the vortex motion of the gases in the GEET reactor. The tube containing the central

rod needs to be very smooth inside. The video shows a diagram by Naresh Vasant dated about July 23, 2006. I think that having a weld ridge would interfere with both the internal and external rotations of molecules as they roll/bounce along that surface. The video shows some GEET reactor plans, including how to properly align the directions of the magnetic fields for the pipes and center rod (Naresh Vasant dated August 16, 2007). Magnetic conventions are specified including the earth's magnetic conventions, which conventions I will now discuss and show.

Example of B Field Relation to Magnetic Poles

Prior to putting together or describing a GEET reactor, we might explain some normal magnetic conventions. Roughly near the True North Pole or north geographic pole of the earth is a south magnetic pole. Near Hudson Bay might be a better location of that south magnetic pole. See Fig. 44 on p. 178 of ***GWU*** or Fig. 4 below for an approximation of the idea but ignoring actual offsets in exact magnetic pole locations. The north magnetic pole of a compass often points north or rather is attracted toward that south magnetic pole. The north seeking end of a compass needle is a north magnetic pole. The compass needle points in the direction of the external magnetic field lines. Such a B field direction might be considered roughly as a tiny vector or arrow pointing from the south end of the compass needle to the north end of the compass needle, with the arrow point end being on the north seeking end of the compass needle. Magnetic B fields or little arrows roughly point out from the north magnetic pole of the earth (located somewhat near the south geographic end of the earth), keep pointing northward as they go northward through the air, point down into the south magnetic pole of the earth (located somewhat near the north geographic pole of the earth), and point down inside the earth until they point or come out from the other end of the earth. Each B field "line of arrows" tends to make a closed loop. An artificial pointing or following language of the B fields was used as we followed the tails to heads of the magnetic B field vectors or arrows.

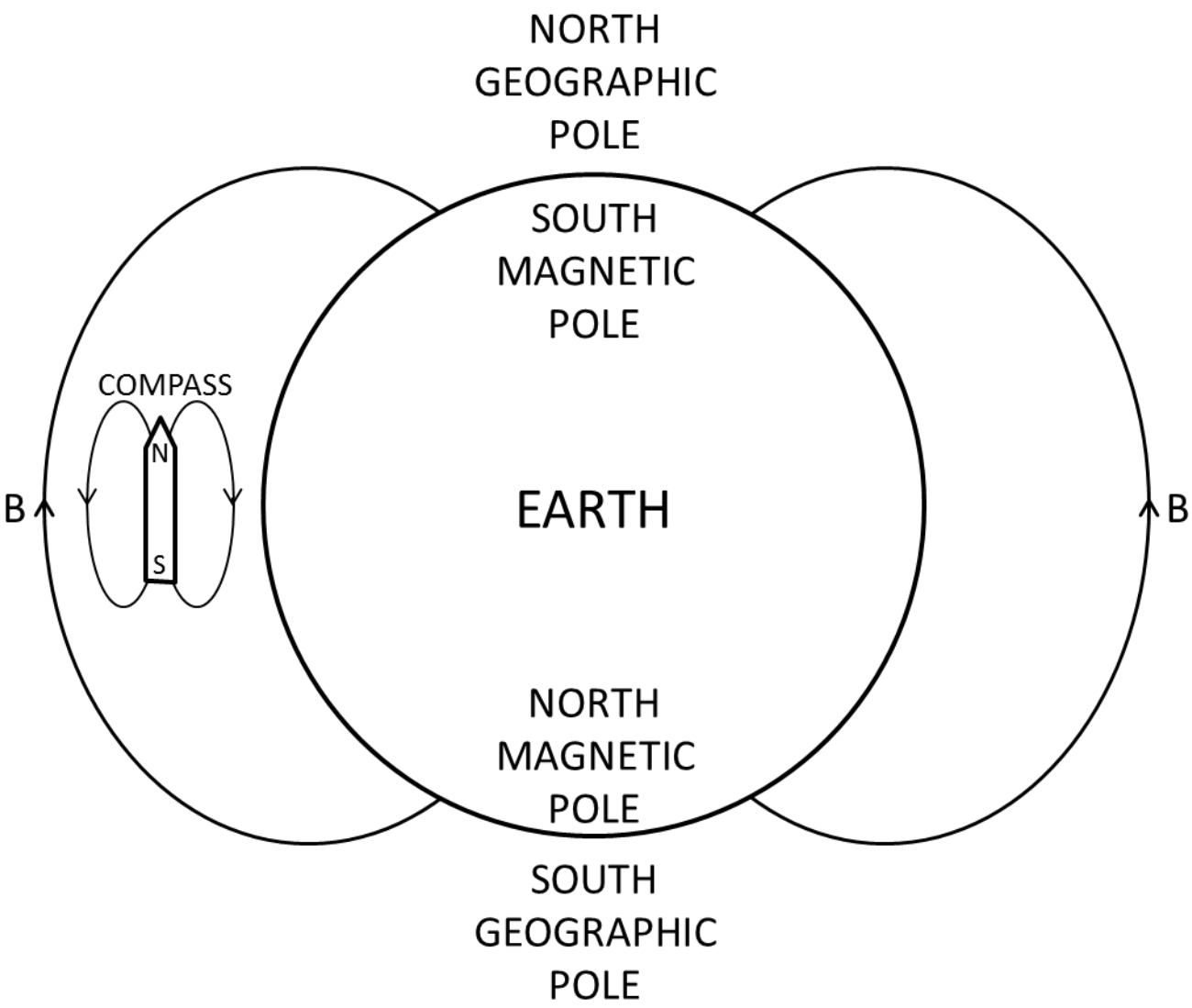


Fig. 4. Magnetic pole conventions.

Initial "Burn In" Run

On the initial "burn in" run of a GEET reactor, one apparently could use the following particular initial alignment. One should have the GEET gas exit end and the magnetic-north-pole-end of the central floating rod approximately closest to geographic north. Thus one should have the fuel-vapor entrance and the magnetic-south-pole-end of the horizontal central floating rod approximately closest to geographic south. One should use compass directions for more precise directions for the burn in run. See Fig. 45 on p. 180 of ***GWU*** or Fig. 5 below for approximate initial alignment of the central horizontal floating rod, which is within a surrounding cylinder of initial and final shown magnetic poles, as viewed from above. More precisely, the horizontal central floating core rod, of the GEET reactor, should best be initially aligned with the prevailing magnetic field lines, as if it were

somewhat like a floating rod compass needle. Again see Fig. 4 for approximate magnet pole conventions.

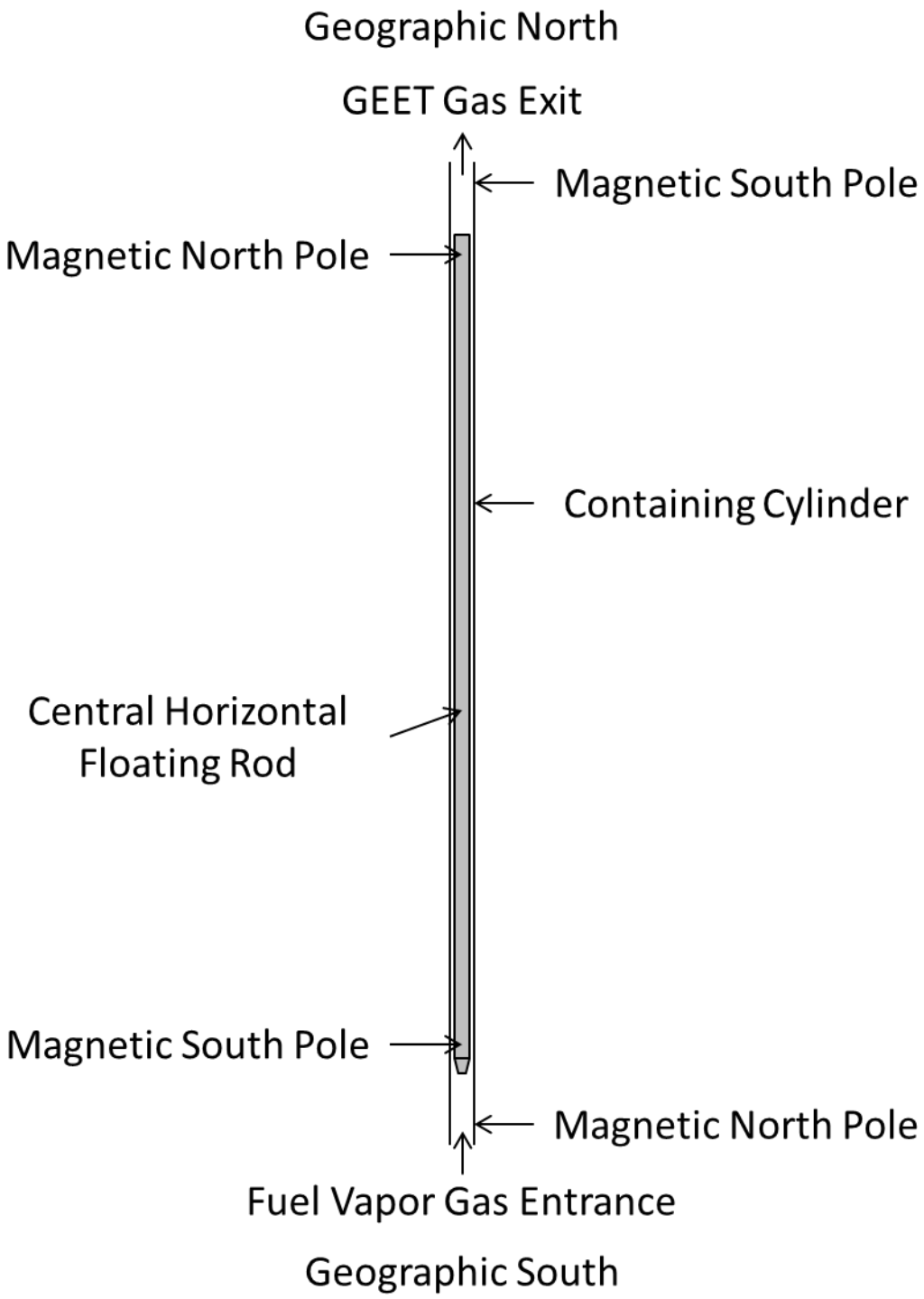


Fig. 5. Initial burn-in approximate alignment of GEET reactor.

GEET Patent, Discussions, and Steps including "Burn-In"

The Internet site, http://www.rexresearch.com/pantone/pantone.htm, with title of "Paul Pantone ~ GEET Fuel Pretreater (US Patent # 5,794,601)" not only provides Paul Pantone's patent; it also provides such things as "The GEET Demystified" by C. P. Kouropoulos, "The GEET Fuel Processor is a Self-Inducing Plasma Generator" by Paul & Molley Pantone, "The GEET Fuel Processor... The Ultimate Home Power Source" by Paul Pantone, and "Do-It-Yourself GEET Construction Plans for a Small Engine (<20 HP)". A simple quote within step 11 of those plans said, 'You must point the exhaust end of the rod due North while starting the engine the first time and let it run for 30 min to "burn in the rod".'

"Burn-In" Rationale. I am reasoning that the "burn in" process allows contrary individual nuclei (or those with nuclear magnetic moments) within the GEET reactor to turn or reinforce the currently prevailing, proper magnetic fields of the central floating rod, despite any prior local magnetic domains in the rod and its surrounding cylinder. This may mean that any contrary magnetic domains are greatly broken up on a fine lattice level and thus partly flexible nucleus size domains are established, which can reinforce currently prevailing, proper magnetic fields in the magnetically floating rod and containing cylinder. Nonetheless prior to the initial burn in, one should select the ends of the materials with the correct magnetic ends (Fig. 5), for the continued lasting benefit of the correct magnetic domains. Don't break up the correct domains, which were oriented properly.

Toward GEET Reactor Closed-cycles. I would hope that some people (after engines are successfully started) search for ways to translationally cool down the input fuel vapor so that the engines more nearly use closed cycle GEET-reactors. Maybe they could use either Tesla turbines and/or radiators to cool down the hot exhaust. Such things would provide greater fuel economy as well as help reduce total gases going out into the atmosphere. Though it might not be perfectly obvious how to get completely there, I think that closed-cycle GEET reactors would be much better for the environment than burning fossil fuels. I think that the GEET reactors should work best in a horizontal orientation or attitude, since they depend upon the Bessler principle. I think that they should work least well in a vertical orientation or attitude. If a GEET reactor is too powerful say with respect to the fuel that it is using, one could orient it closer to a vertical attitude so that it is not so powerful.

Water in Fuel. If using water as part of the fuel for the GEET reactor, I am currently thinking that the oxygen would not tend to be broken down, since normally O^{16} does not have a nuclear magnetic moment (p. B-249 in ***CRC***).

Some GEET Details

Here are some details of the GEET reactor. For simplicity, I assume that the GEET reactor is "horizontal". Because no nucleus is at absolute zero (0°K), there is no nucleus that always has a perfectly zero angular velocity. Effectively all nuclei rotate slightly.

Example GEET Reactor Illustration. I will attempt to convey the idea of the GEET reactor in the not-to-scale Fig. 6 shown below or equivalently Fig. 46 on

p. 184 of ***GWU***. If you can't leave a bookmark or a finger marking that Fig. 6, then you might want to have the equivalent Fig. 46 from ***GWU*** p. 184 readily available so that during later descriptions referring to Fig. 6 you can simply switch over to the same figure from ***GWU*** so that you don't need to lose your place or waste time moving back to the figure while reading the descriptions about it. Using an extra copy of this file as a reference will also work. The figure shows not-to-scale top views of a GEET reactor, consisting of a horizontal rod and its containing cylinder. To improve clarity, the figure is broken up into two parts. Each part describing the GEET reactor is rotationally symmetric about the center axis of the GEET reactor. The left part shows the motion of some particles. The right part shows the magnetic B field lines. Magnetic B field lines, "point" along a curve from a magnet's north magnetic pole to a magnet's south magnetic pole, when outside all magnets. One could compare those situations with the magnetic field lines in Fig. 4.

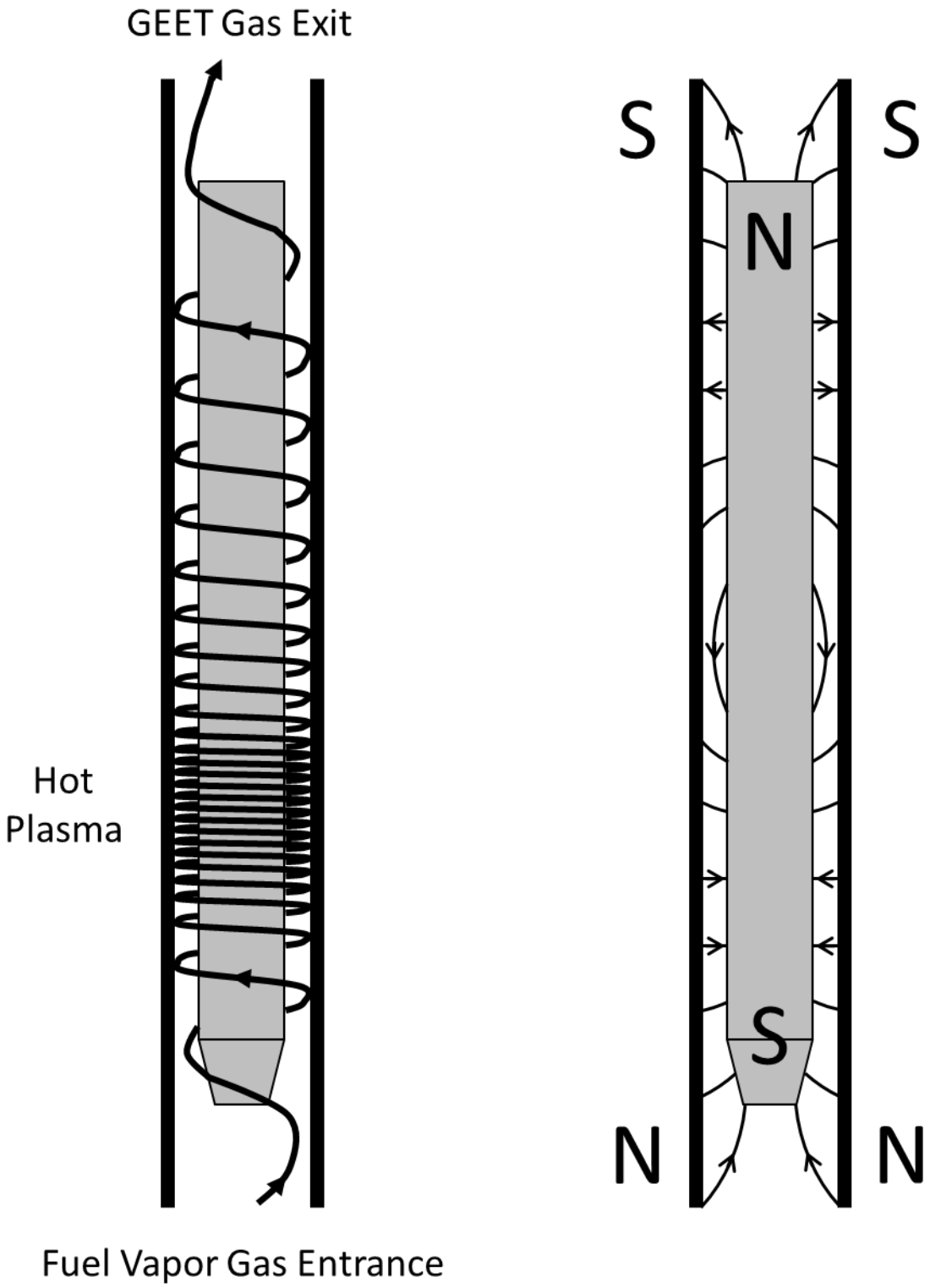


Fig. 6. Particle motions and B fields within GEET reactor as viewed from above (not to scale).

How and why do GEET reactors work? See pp. 176-198 of ***GWU*** for my prior discussion. In the presence of special cylinders with magnetic fields, typically GEET reactors use the Bessler principle to break up molecules by means of rapidly rotating vaporous molecules and nuclei about internal horizontal axes in the presence of plasmas. That is the short explanation. See Fig. 5 (or Fig. 45 on p. 180 of ***GWU***) for the initial alignment for "burning in" of a GEET reactor. See the following discussion or p. 182 of ***GWU*** for some basic theory.

GEET Basic Theory. As I understand it, the way that the GEET reactor basically works is that it encourages (initially under conditions of little rotational interference or mutual disruption): (1) many molecules and nuclei to rotationally align with magnetic field lines, (2) many molecules and nuclei to rotate/spin more internally, obtaining larger angular speed by the Bessler principle, (3) the molecules to externally rotate/swirl more about "horizontal" axes under the influence of some bounce-rolling along the inner smooth surface of the containing cylinder, and (4) molecules to be rotationally knocked apart, after enough *rotational kinetic energy* is pumped into the rotating nuclei by the two-part gravitons while the swirls of molecules are delayed/bunched together. The larger the internal angular speed of a nucleus about a horizontal axis means that more rotational power is picked up by it from the Bessler principle. With friction, large rotational kinetic energies can help create free electrons and photons in plasmas, which mean that ions are formed and molecules are broken apart. When fully operating, the central rod of the GEET reactor floats at the center of the GEET reactor because of strong magnetic fields and partly because of swirls or external rotations. Within the GEET reactor, there is initially little outside interference or disruption to individual nuclei of the gas/plasma. This allows the rotating nuclei to attain large angular speeds (via the Bessler principle) and become rotationally-thermally very "hot" but stay translationally-thermally not very "hot" for centers of mass near the rotationally hottest interior portion of the GEET reactor. As the exit to the GEET reactor is approached the reversed magnetic field lines cause the internal rotating ground states to slow down the external translational rotational motion by interaction with the inner surface of the containing cylinder. More details are given below for how GEET reactors actually work at the finest levels similar to that shown on pp. 183-195 ***GWU***. See Fig. 6 above (or Fig. 46 on p. 184 of ***GWU***) for an illustration of the external molecule motion in the presence of magnetic fields for a GEET reactor. See Fig. 7 below (or Fig. 47 on p. 187 of ***GWU***) for the alignment of a rotating positive nucleus in the presence of a magnetic field. If you don't want to see more details now, you can just skip to the explanation of the next enigma (Jupiter-Saturn Excess Radiation).

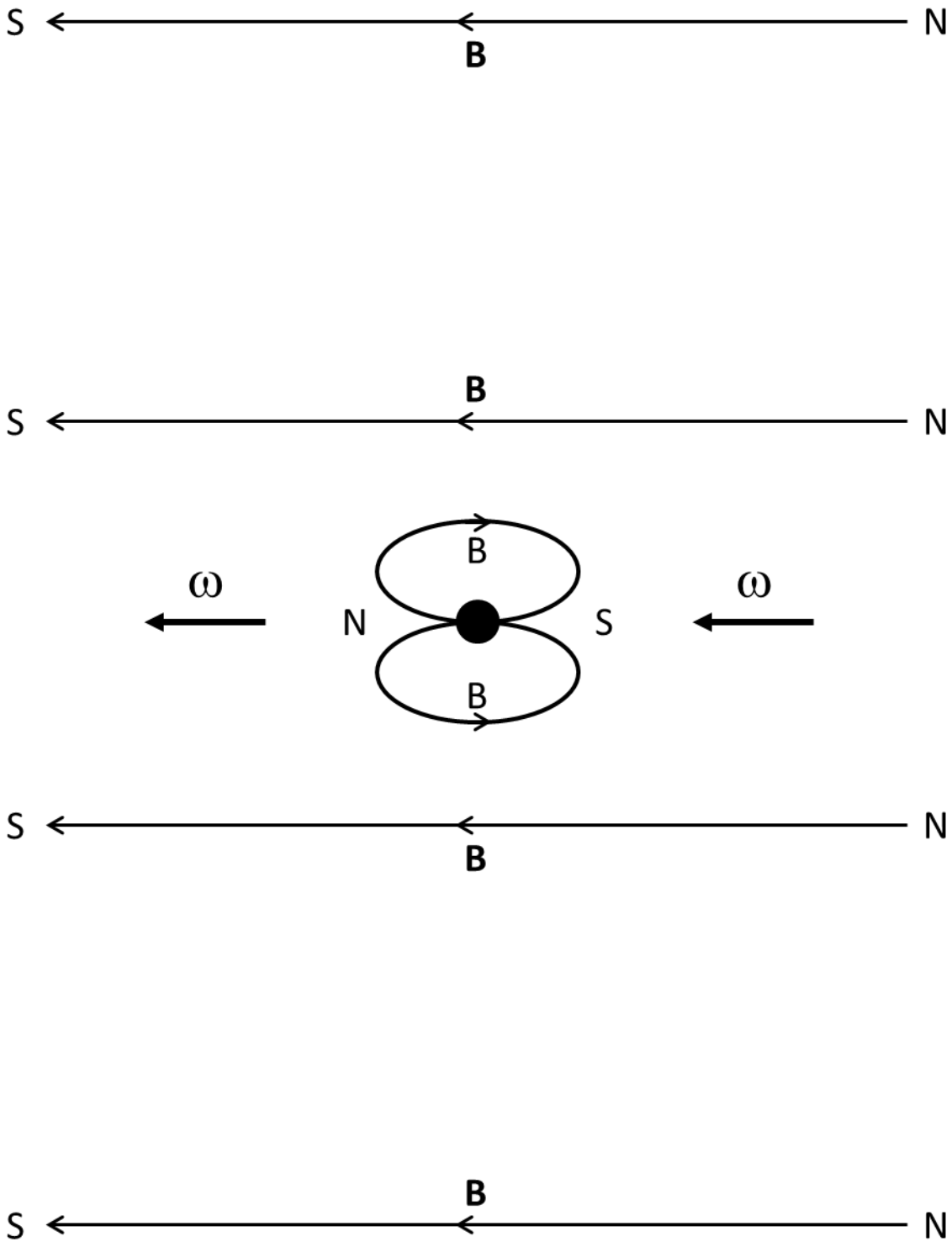


Fig. 7. Rotating positive nucleus aligning in external magnetic field.

Some GEET Geometry. We assume as shown in the not-to-scale illustration in Fig. 6 that the containing cylinder is longer than the central rod. If the

containing cylinder is not enough longer and if the central rod is not long enough, then the GEET reactor will not be powerful enough. For a horizontal GEET reactor, the entrance to the containing cylinder needs to begin well before the beginning of the floating central rod to provide a long enough region of nearly horizontal magnetic fields at the entrance. The entrance end of the containing cylinder is a north magnetic pole. The exit end of the containing cylinder is a south magnetic pole. Again, if you don't want a more detailed explanation of the GEET reactor, then you can just go to the explanation of the next enigma.

Direction sn. The end of the floating central rod that is near the input vapor entrance of the GEET reactor is a magnetic south pole. Its other end near the exit is a magnetic north pole. That direction of the floating central rod through the center of the central rod from its magnetic south pole to its magnetic north pole (and any parallel directions) could be called the direction sn (or equivalently the direction +sn). The direction sn is parallel to the direction of the GEET reactor, which points from the gas entrance to the gas exit of the reactor.

Blunt Entrance End of Rod. The south-pole entrance end of the central floating rod should be blunt so as to slow down (in part by collisions) the speed of the atoms/molecules/nuclei going in the sn direction with respect to the GEET reactor. Later described interactions would not work as well, if the particles were not translationally slow in the +sn direction. That means that the particles should be translationally cool for similar reasons. A constriction of the passageway creates a decrease in pressure by the Venturi effect, which effect is associated with part of Bernoulli's principle. A drop in gas pressure reduces interference between molecules/atoms/nuclei, which allows the Bessler principle to work better. The decrease in the pressure is associated with an increase in speed, by the Venturi effect, but the increase in speed is not in the +sn direction, as will be explained below. The translational vortex flow (partially perpendicular to the +sn direction) indirectly allows the molecules/atoms to greatly "linger" in the GEET reactor, with little speed in the +sn direction.

Angular Velocity Creates Magnetic Dipole. Suppose we have a nucleus or a molecule without a measurable nuclear/molecular magnetic moment that is slowly heading directly in the direction +sn toward the blunt-point center of the central rod of the GEET reactor, near the entrance end. For a horizontal rod, the magnetic fields are somewhat horizontal there. Such nuclei are not all frozen in internal angular velocity (assuming the temperature is above absolute zero). A nucleus should thus have at least some small internal angular speed. The angular velocity vector is defined to have a magnitude of the angular speed and it has direction as follows. The angular velocity vector points in the direction that a right-hand screw would proceed in, if it were so rotated in its screw hole. See the innermost portion (temporarily without the external magnetic fields) of Fig. 7 (or Fig. 47 on p. 187 of ***GWU***) for the magnetic dipole of the nucleus caused by the angular velocity vector of the positive nucleus. Fig. 7 could be a side view illustration of a rotating positively charged nucleus (of angular velocity, $\boldsymbol{\omega}$) causing a magnetic dipole, which dipole then aligns in an external magnetic field as shown. As the nucleus has a net

positive charge, this means that the internal angular velocity creates a slight magnetic dipole, with the north magnetic pole end (N) being associated with the same location as the arrow point end of a single internal angular velocity vector (**ω**) centered on the nucleus. The south magnetic pole end of the nucleus (S) is associated with the same location as the tail end of a single internal angular velocity vector (**ω**) centered on the nucleus.

Magnetic Dipole Alignment with External Fields. Such an atom or nucleus would tend to rotate (like a compass does) so that its north magnetic pole end is then closer to the central rod's south magnetic pole. Now consider all portions of Fig. 7 including the external magnetic fields. That is the final orientation of the tiny magnetic dipole when placed in an external magnetic field.

Bessler Principle Increases Angular Speed. Since the nucleus is rotating about a nearly horizontal axis it would tend to acquire more angular speed by the Bessler principle, assuming there is little interference from its surroundings. The lower pressure, within the GEET reactor entrance, allows there to be less interference from the surrounding particles. The large mass of the nucleus dominates over the much smaller mass of the electron with respect to the Bessler principle. The increase in angular speed would increase the magnetic dipole moment of the nucleus, thus keeping it similarly aligned.

Magnetic Dipoles Strengthen Central Rod Magnetic South Pole. As some of these +sn direction magnetic dipoles try to slam (north pole first) into (or attach onto) the blunt south-magnetic-pole surface of the central rod, this would strengthen the south-magnetic-pole end of the central rod. That slamming/attaching of atoms/nuclei with magnetic dipoles into/onto the south-magnetic-pole surface of the floating central rod is another reason why that south-magnetic-pole end of the floating central rod on the entrance end of the GEET reactor should not be pointed. Probably the flatter is better. I think it needs to in part be blunt on its entrance end so as to increase the slamming/attaching opportunities, which help strengthen the central floating magnet of the GEET reactor. Some of the atoms that slam into the south-magnetic-pole end of the central rod could stay magnetically stuck at the surface with their nuclei maintaining, if not acquiring large angular speeds by the Bessler principle. This provides strong magnetic dipoles, thus helping to maintain the great magnetic strength of the central rod and containing cylinder. Other nuclei within the central rod could preserve large angular speeds by the Bessler principle, which would also preserve the great magnetic strength of the central rod.

Nuclear Magnetic Moments. Some "normally" rotating nuclei have positive nuclear magnetic moments, many have zero or no "measurable" magnetic moments, and a very few have negative magnetic moments. Light hydrogen (with nucleus composed of a proton) has a positive nuclear magnetic moment of +2.79278 nuclear magnetons and the neutron has a negative nuclear magnetic moment of -1.9131 nuclear magnetons (p. B-247 of ***CRC***) where ***CRC*** still represents the 52nd Edition ***CRC Handbook of Chemistry and Physics***. Heavy hydrogen or deuterium (with nucleus composed of a proton and a neutron) has a nuclear magnetic moment

of +0.85742 nuclear magnetons (p. B-247 of ***CRC***). Helium-4 (with nucleus composed of two protons and two neutrons) does not have a measurable nuclear magnetic moment (p. B-247 of ***CRC***). Carbon-12 does not have a measurable nuclear magnetic moment (p. B-248 of ***CRC***). Oxygen-16 does not have a measurable nuclear magnetic moment (p. B-249 of ***CRC***). Nitrogen-14 has a measurable nuclear magnetic moment of +0.4036 nuclear magnetons (p. B-248 of ***CRC***).

Zero Nuclear Magnetic Moment Nuclei. There might not be enough time for normal GEET reactors to build up great angular speed for nuclei initially with no measurable nuclear magnetic moments. This might tend to keep such nuclei from being ripped apart in an ordinary GEET reactor. If nuclei without measurable nuclear magnetic moments were embedded in molecules that could be caused to rotate, then those nuclei could be caused to rotate in a GEET reactor and might be more likely to be ripped apart by a powerful enough GEET reactor. Carbon well embedded in a large vaporous hydrocarbon molecule might be more likely ripped apart than oxygen in a tiny vaporous water molecule, with only two hydrogen atoms.

With Magnetic Moment. A nucleus or a molecule with a magnetic dipole moment would rotate like a compass and move with its north magnetic pole proceeding first and strengthen the central rod magnetic south pole. As it heads toward the south magnetic pole of the central rod, it could have a slight angular velocity either (case 1) in the +sn direction or (case 2) in the -sn direction (meaning the direction opposite the +sn direction).

Case 1. This case 1 initially corresponds to the usual case of a nucleus with either a zero nuclear magnetic moment or a positive nuclear magnetic moment. If the internal angular velocity of such a nucleus (internal meaning about its center of mass) is nearly horizontal (and thus nearly in the +sn direction according to the direction of the local magnetic fields), then the Bessler principle would cause the angular speed to increase and this increased angular speed would increase the total strength of the magnetic dipole, because of the general positive charge of the nucleus. See Fig. 7 (or Fig. 47 on p. 187 of ***GWU***).

The situation is more complicated for molecules than nuclei due to there being internal angular velocities within nuclei and motion of atoms about other atoms in a molecule. Still, there would be a net magnetic moment for each molecule, which I think typically for case 1 nuclei is associated with angular velocities (about their centers of mass) pointing in approximately the same directions as the magnetic moment. One can do more detailed analyses if desired for particular cases of such molecules but I am not going into such analyses here. I am just doing the simplest analysis.

Case 2. This case 2 initially corresponds to the rare case of a nucleus with a negative nuclear magnetic moment, since nuclei with negative nuclear magnetic moments are rare. If the angular velocity of a say nucleus is horizontal and in the negative or rather in the -sn direction at some very fine level, then the Bessler principle could cause the angular speed to increase and this would decrease the

total strength of negative magnetic dipole, because of the general positive charge of the nucleus. If the magnetic dipole were decreased enough, the dipole directions could change, the dipole could rotate like a compass so that its north magnetic pole again faces toward the south magnetic pole of the central rod and the angular speed could continue to increase and now the angular velocity would be in the +sn direction, which could somewhat be treated as in the case 1, but have the rotational effects greatly depressed, due to its slow start.

Further discussion of the case 2 would proceed similarly to the case 1 discussion, which I now continue to elaborate on. I will thus just carry on the discussion assuming we are only in the case 1. If there is not enough time to change case 2 to case 1, then the case 2 might be switched to case 1 by the overwhelming swirling case 1 motions and interactions with the containing cylinder.

Case 1 Further from Central Rod. Consider nuclei or atoms or molecules in case 1 initially near the entrance but further from the center of the central rod. Because of the magnetic direction is mostly in the +sn direction as shown on the right side of Fig. 6, the particles would tend to have components of internal angular velocities mostly in the +sn direction. There would be an overlap between the electron wavefunctions and the nuclei. As the nuclei/molecules have internal angular velocity components in the +sn direction, then the surrounding electron wavefunctions would also tend to have additional internal angular velocities components in approximately the +sn direction. The angular velocities of the electron wavefunctions could slightly lag those of the nuclei, as the overlap region in the nucleus is small.

Swirling in Direction -sn. Many of those rotating atoms/molecules (with internal angular velocities in the +sn direction about their centers of mass) often interact with the inner surface of the containing cylinder of the GEET reactor. Their electron wavefunctions would thus often bounce-roll over the surface of the containing cylinder creating a gross swirling or external angular velocity in the -sn direction, as shown in the left side of Fig. 6. The external angular velocity is with respect to the center line of the cylinders. The power from the swirl indirectly comes from the Bessler principle. Note that they have some translation velocity components in the +sn direction (according to the general flow of the gas) but the large-scale rotational motion around the central rod corresponds to larger-scale swirling motion or external angular velocities in the -sn direction. The swirling does not come about because of positively charged atoms (meaning positive ions) interacting with the magnetic fields, since the atoms/molecules are neutral and not yet ionized at the entrance of the GEET reactor.

Increased Swirling. As the swirling begins, this often throws many nuclei/atoms/molecules outward to the inside cylinder walls of the containing cylinder. There is thus even more roll-bouncing contact between the surrounding electron wavefunctions in the gas vapor atoms and the inner surface of the containing cylinder. This further increases the larger-scale swirling motion or external angular velocities in the -sn direction.

Smoothness on Inner Surface of Containing Cylinder. A smoother inner surface of the containing cylinder allows greater swirling about the central rod. How is that? A smoother surface (close to the entrance end) allows for more momentary rolling/bouncing motion of the atoms/molecules over that surface, which rolling/bouncing motion can better transfer more internal angular momentum of the particles to swirling motion. A smoother surface also allows for less impedance or less friction to the generated swirling. Greater swirling caused greater bounce-rolling at the inner surface edges of the containing cylinder. Greater rolling is associated with greater internal angular speed of the atoms/molecules/nuclei of the gas vapor. The greater internal angular speed of each nucleus (about its center of mass in nearly the horizontal +sn direction) means even greater internal angular speed is acquired from the Bessler principle, for the frequent situation of low internal rotational friction. Greater internal angular speed for the nuclei means greater internal angular speed for the atoms and molecules about their centers of mass. There is back and forth communication of the internal angular speeds between nuclei/atoms and the molecule as a whole. As they roll/bounce with greater internal angular speed along the initial inner surface of the containing cylinder, they acquire greater translation speed, though more so nearly perpendicular to the sn direction (with external angular velocity in the -sn direction about the center line of the cylinders). The interdependent processes keep continuing as the swirling motions resonate.

Vehicle Analogy. One can think of a vehicle powered with faster rotating tires causing the vehicle to go faster as long as it doesn't run into great bumps or potholes in the hopefully smooth pavement. The atoms and molecules swirl faster, as suggested in the left side of Fig. 6. Briefly stated, smooth regions on the inside surface of the containing cylinder allow the GEET reactor to be more effective in creating swirling motions about the floating rod and to be more effective in internally rotating molecules. Thus, one should use an inner surface of the containing cylinder that is nice and smooth, without any weld or formation marks.

Motion at Surface of Central Rod. For the two somewhat opposing cylinders (one within the other), the surface normals pointing outward-away from the inside-central floating rod are typically locally opposite the surface normals pointing inward-away from the containing cylinder inner surface. The surface normals locally point at each other. As a nucleus rotates with angular velocity initially in the +sn direction, there would be an interaction with the surrounding-overlapping electron wavefunctions so that the electron wavefunctions would also rotate with an angular velocity pointing in the +sn direction. Now with any rare almost-rolling or bouncing contact between those electron wavefunctions and the surface of the central rod, this might attempt to induce a slight swirling of angular velocity in the +sn direction, if it were not for the much more effective swirlings induced at the containing cylinder surface in the -sn direction.

Containing Cylinder Surface Is More Effective. Any actual local swirling, in either direction, would tend to make motion contact at the surface of the central rod less likely/effective than contact at the inner surface of the containing cylinder.

That is because any such primary swirling would tend to carry the atoms and molecules away from contact with the central rod. With diminished contact, any swirling in the +sn direction would thus be less likely than the prevalent swirling in the -sn direction.

Area Effectiveness. The swirling in the +sn direction would also be less effective than the actual swirling in the -sn direction due to the differences in the amounts of surface area. The surface area inside the containing cylinder is larger than the surface area outside the central rod.

Rod Roughness? Swirling in the +sn direction might be even more reduced by making the surface of the central rod slightly rougher than the smooth inside surface of the containing cylinder. Would the GEET reactor slightly benefit by having the surface of the central floating rod less smooth than the surface of the inner containing cylinder? Possibly, but it might also slightly increase friction with respect to swirling in the -sn direction. I would guess that one should not on purpose make the surface of the central floating rod rough, unless there is persistent evidence otherwise.

Some Bunching-up of Swirls. With the gross average rotational swirling or angular velocity (relative to the center line of the floating rod) in the direction -sn and with the average velocity of the molecules/atoms in the +sn direction of gas flow, the magnetic fields between the containing cylinder and the central rod point more radially inward, as the molecules/atoms go further into the GEET reactor. See the right portion of Fig. 6 showing the more inward pointing magnetic fields. The magnetic dipoles of the atoms/molecules stay aligned with the more inward pointing magnetic fields. The tilted magnetic dipoles internally rotate about those axes, which as they touch the inner surface of the containing cylinder only slightly increase external angular velocity (with respect to the line at the center of the cylinders) in the –sn direction. The dipoles are generally less horizontal and less effective, which results in more bunching up of the atoms/molecules. Later stages will even do more bunching up. That bunching up may be seen in Fig. 6 by the swirls on the left portion beginning to get closer. The bunching up increases as there are greater changes in the radial components of the magnetic fields.

Rotation Each Swirl. Because of the inward direction of the magnetic fields, the magnetic dipoles also internally rotate once per swirl around the central rod. There would thus be an additional type of rotation (once per swirl) created about an internal horizontal axis of each atom/nuclei, possibly allowing (in that way) even slightly more *rotational kinetic energy* to be acquired by the Bessler principle. With the swirling slightly increasing in angular frequency, there would be rotations of the magnetic dipoles (once per swirl) which could cause some magnetic dipole radiation to be given off.

Friction from Radial Inward Angular Velocities. With magnetic B fields pointing radially inward from the containing cylinder to the floating rod, the magnetic dipoles and the internal angular velocities of the nuclei are also radial inward. Because of the overlap between the nuclei and their surrounding electrons, any attached or partly attached electrons thus tend to rotate with internal angular

velocities pointing radially inward. Any time such electrons bump into the inner wall of the containing cylinder, there would be increased friction or heating associated with their interaction. Rare bumping into the outer wall of the central floating rod would also increase friction. These non-rolling contacts would help increase friction. Electrons rotating about nuclei colliding with neighboring electrons rotating about other nuclei also increase friction. Electrons ripped off by the friction can knock off other electrons thus helping to establish plasmas. A couple of times per swirl, a radial inward internally rotating nucleus will rotate about a horizontal axis, which near such times allows more *rotational kinetic energy* to be obtained from the Bessler principle.

The friction from atoms in molecules hitting the inner surface of the containing cylinder would be greater than the electrons bumping into the wall of the containing cylinder. If the local internal rotational axis (approximately the magnetic moment) deviates much from the needed internal rotational axis, nearly +sn, then this creates much friction. The greatest deviation is when the magnetic field lines are radically inward, since the local internal rotational axis is approximately in the direction of the magnetic moment. With no effective rolling, according to the great deviation, atoms of the molecule are slammed down on atoms of the inner containing cylinder surface. There is much rubbing in the case where the magnetic moments are perpendicular to the inner surface of the containing cylinder or the internal rotational axis is normal to the inner surface of the containing cylinder.

Plasma Forms. A plasma forms while there is bunching up of the swirls. There is bunching up of the swirls because of the magnetic fields approaching and leaving the radial inward directions. During that approach and leaving, the angular velocities are approaching and leaving radial inward values, which upon contact with the surface of the containing cylinder will cause a backing up, thus creating the region of the swirls bunching up or in tight swirls. Earlier (in paragraph “Some Bunching-up of Swirls”) I said "molecules/atoms" but with increased *rotational kinetic energy* picked up from the Bessler principle, there would be a point where the molecules would be energetically knocked apart and where some atoms or their electrons may be knocked away, forming a plasma of separated atoms or ions. Two very close molecules rapidly rotating with angular velocities in the same direction can mean that atoms from opposing molecules can have head on collisions with each other, which can knock at least one of the atoms out of its respective molecule. I think that, when the swirls are bunched up together in tight swirls, the plasma mainly arises more from collisions (and especially collisions with the interior surface of the containing cylinder) than from the molecules being rotationally ripped apart by the rapid, quite-inward local-angular-velocities. Also, there is some friction of electrons colliding with other electrons both by near misses of the atoms and by rubbing at the surface boundaries of the inner containing cylinder. Hit electrons can knock away other electrons, creating ions or disassociating molecules. Attracted electrons within atoms can be knocked away or outside of atoms when electrons collide with rotating nuclei. Such interactions can also lead to the disassociation of molecules.

Advantage of Internal Rotational Plasma. Since the plasma is more a rotationally-induced plasma than a translationally-induced plasma, this has the advantage in that it should reduce damage to the metal boundaries. Within the plasma, the rapid internal angular velocities are nearly in radial inward directions, while the external tight swirls are in the -sn direction.

Swirl Slow Down. After the region of greatest external swirling and internal-angular-velocity plasma, associated with more radial-inward pointing magnetic fields, there is then a region of horizontal magnetic fields with the magnetic B fields pointing more in the -sn direction. This region and its preceding transition region would have a braking effect (think friction and electron collisions with surface) on the angular speed of the swirling nuclei/ions, as it would cause the internally rotating nuclei/ions/atoms to try to reverse the direction of their internal angular velocities (somewhat like a compass turning) so that they point somewhat more in the direction of -sn. Any partially or occasionally attached electrons would also somewhat tend to rotate with a -sn angular velocity around their nuclei because of electron wavefunction overlap with the rotating nuclei, with angular velocities in the -sn direction, allowing some acquisition of internal rotational energy by the Bessler principle. The electrons can come and go as they are in a plasma state but they may linger as they come and go. Any somewhat attached electrons tend to rotate about their nuclei with nearly the same angular velocities in the -sn direction. As these electrons interact with the inner surface of the containing cylinder, this would cause the prior swirling motion about the floating rod in the -sn direction to be reduced. The interaction of the electrons with the inner wall of the containing cylinder means that they and consequently the nuclei they surround both decrease their internal angular speed. The reduction in the internal angular speeds and the external swirling angular speed then somewhat reduces the plasma.

More Slow Down. Then the nuclei, etc. would proceed to a region of the GEET reactor in which the magnetic B fields would be pointing more radially outward with a smaller amount of a B field component (and their internal angular velocities) in the -sn direction. See Fig. 6. The -sn components of the internal angular velocities (by interactions with the inner surface of the containing cylinder) would continue the process of slowing down the swirling motions. What swirling exists still would throw the atoms or partially ionized atoms against the inner surface of the containing cylinder which would continue the process of swirling slow down. That would tend to frictionally fight against energy pickup via the Bessler principle.

Radial Outward Magnetic Fields and Angular Velocities. According to Fig. 6, a portion of the GEET reactor is encountered in which the magnetic B fields are radial outward from the floating rod. That causes the magnetic dipoles to be radial outward. That means both the rotating nuclei and their surrounding electron wavefunctions both have radial outward angular velocities. As those electron wavefunctions interact with the inner surface of the containing cylinder, there is friction which contributes to the loss of angular speed. Nuclei with smaller angular speeds would not pick up as much energy from the Bessler principle. A couple of

times per swirl, a radial outward internally rotating nucleus will rotate about a horizontal axis, which at such times allows more *rotational kinetic energy* to be especially obtained from the Bessler principle. Not much *rotational kinetic energy* is picked up at such times because the internal angular speeds are small (due to the prior slow down) and the internal angular velocities are often about vertical axes.

Exit End. On the exit end, there are magnetic fields more in the +sn direction, which horizontal magnetic fields allow rotating nuclei to reacquire some internal rotations about horizontal axes and maintains some of the swirl or external angular velocity in the -sn direction. There is *rotational kinetic energy*, translational kinetic energy, and radiation. Such available energy and strong magnetic fields help prevent molecules from reforming in the exit end. Some pairs of hydrogen atoms may form lines in the magnetic fields, according to the magnetic dipole moments of their nuclei. Later when they leave the strong magnetic fields, they can fold over as north magnetic poles attract south magnetic poles.

Understand Illustration. You should now be able to understand the illustrations in Fig. 6 after considering the above discussion of how and why these phenomena exist. I have been trying to paint a picture of basically what is going on in the GEET reactor. Molecules, atoms, ions, and nuclei are provided greater angular speed within the GEET reactor because of the Bessler principle. These things interact with the magnetic fields, themselves, and the inner surface of the containing cylinder of the GEET reactor, rotationally knocking off atoms by collisions, rotationally knocking off electrons, and breaking up molecules in the plasma. Then atoms are rotationally much slower near the time of leaving the GEET reactor because of the Bessler principle than they were in the plasma.

Is Surrounding Exhaust Essential?

I wondered if it is essential to surround the GEET reactor with return exhaust. One might suppose that surrounding a GEET reactor with higher temperature exhaust would provide extra energy for the breaking down of molecules in the GEET reactor. I think that it would be ill advised to provide higher temperature vapor/particles going into a GEET reactor, since it would generally increase the translational motions of the particles. That would cause the particles to more quickly go through the reactor without making use of the required Bessler principle. I think that the Bessler principle plays an essential role in breaking apart the molecules of greater importance than the thermal translational heating within the GEET reactor. I also think that it would also be ill advised to provide external higher temperatures to every follow-on step within a GEET reactor so as not to upset any of the Bessler principle operations going on in the steps. I would suggest not going to the extra effort of surrounding the GEET reactor with return exhaust but I have not done such experiments so it is probably better to do what works best. Pantone suggested the simplification of not running the hot exhaust through the bubbler (without cooling it first, say by using a Tesla turbine), to keep the input fuel to the GEET reactor cooler. Has anyone tried the further simplification of not surrounding the GEET reactor with exhaust? Doing so would keep the fuel of the GEET reactor translationally cooler during all steps.

The only reason that I can think of having the outer pipe exhaust flowing the opposite direction to the inner fuel flow would be to enhance the magnetic fields within the GEET reactor. I think that we could allow outer pipes to be there for magnetic support but we might not need to have hot exhaust flowing through them. Just as the central rod is placed loose within the GEET reactor, we might even leave "loose" the magnetic pipe outside the GEET reactor. They both might just magnetically adjust themselves as the GEET reactor runs. We could also just not leave any pipes outside the GEET reactor.

Keep Input Fuel Gaseous. Having cool/cold input vapor to a GEET reactor is important, but on the other extreme, we wouldn't want the input fuel vapor so cold that it is no longer a gas.

Transition Benefit of GEET Reactor

I think that the GEET reactor may serve a valuable purpose of beginning to transitionally wean us off fossil fuels. I recommend that engine designers make as much use of the GEET reactors as possible. Engines modified for using fuel from GEET reactors could be close to what they previously have been but less fossil fuel should be consumed. There wouldn't need to be a separate water tank for later mixing with the fuel, if conditions are well understood and implemented for getting the GEET reactor started and operating with say gasoline and water in the fuel tank. For example, since gasoline floats on top of water, fumes from the top of the fuel tank could be used to start the GEET reactors. Vapor mainly formed from the water/fuel taken from near the bottom of the fuel tank might then be used to later operate the previously started GEET reactor. Systems may be needed to keep the input vapor sufficiently cool prior to going into the GEET reactor.

There should be other Bessler principle devices that will assist in weaning us off of fossil fuels in an environmental friendly manner.

13~ Explanation of Jupiter-Saturn Excess-Radiation Puzzles

Excess Radiation from Bessler Principle

The dominant source of excess radiation produced by the atmospheres of Jupiter and Saturn comes from the Bessler principle. By the Bessler principle, heating radiation does come from the atmospheres and upper atmospheres of Jupiter and Saturn. Electrons struck by the rapidly rotating nuclei in the atmospheres cause photons to carry away some of the energy acquired by those rotating nuclei, which are produced by the Bessler principle. This and other sorts of friction prevent the rotating nuclei in the lower-denser atmospheres from rotating too rapidly and acquiring too much *rotational kinetic energy*. A type of rotational friction would be magnetic dipoles going near other magnetic dipoles tending to keep many dipoles from being horizontal. The average temperature surrounding those planets in all directions is approximately 3° Kelvin (p. 87 of ***GWU***), but the atmosphere is not liquid/frozen because of the much *rotational kinetic energy* acquired in the many rotating nuclei found in the atmosphere, according to the simple power statement of the Bessler principle (see above in section "Alternate Statements of Bessler Principle" or see in paragraph "Simple Statement of Bessler's

Principle" found on p. 71 of ***GWU***). The source of excess radiation from Jupiter and Saturn gives evidence for the Bessler principle.

It would be partial analysis to only consider the radiation coming from the sun to warm a planet. For a planet without an internal source of power, it is the total equilibrium (with all the surrounding blackbodies) that counts, assuming that the zeroth law of thermodynamics is a valid sort of concept. Having an internal source of power for a planet (supplied by say the Bessler principle), would increase the temperature of the planet well beyond that of the average of the surrounding temperatures.

Radiation Belts Produce Energetic Radiation. Some people speak of energetically moving charged particles in radiation belts but they typically don't speak of how there can be some extra radiation produced from some of the particles. Under quite rarified atmospheric conditions, nuclei are able to rotate with very low friction about somewhat horizontal axes. The greater the angular speed of the nuclei causes them to especially obtain more or greater *rotational kinetic energy* from the Bessler principle. The very rapidly rotating positively-charged nuclei become tiny magnets. When an electron is attracted to one, it is struck by the rapidly rotating nuclei and produces extra mysteriously energetic radiation.

Lower Elevation Production of Radiation. At lower elevations, there are more nuclei in the gases so there are more opportunities for producing radiation. The radiation produced at lower elevations is a similar but less energetic process because there is greater rotational/magnetic interference. Nuclei rotating about horizontal axes are little magnets, which upon interaction with others often cause them to no longer rotate about horizontal axes. If the nuclei do not rotate about somewhat horizontal axes, then they acquire less *rotational kinetic energy* by the Bessler principle. Also many electrons are available at lower elevations to be struck and allow photons to often carry away *rotational kinetic energy*. With the energy more often being carried away, the nuclei do not rotate as rapidly. The less rapid rotations cause them to obtain much less *rotational kinetic energy* by the Bessler principle. The radiation produced is individually less energetic. That is why the radiant photons produced are individually less energetic at lower elevations. The photons can be so low in energy that they can correspond to radiant heat. Also, other energetic photons (which may be produced at higher elevations but happen to be sent to lower elevations) are converted to more photons of less energy by various means, until there remain many long wavelength photons corresponding to radiant heat. These ideas would qualitatively explain the excess radiant heat coming from the planets at lower elevations.

Planets out in Interstellar Space Need Not Be Frozen

Many people incorrectly assume that planets located out in interstellar space must be frozen. The analysis for Jupiter and Saturn producing excess radiation by the Bessler principle could similarly apply to some lone planets in interstellar space, with surrounding directional temperatures of 3° Kelvin. Such planets need not be frozen, if they are massive enough to retain an atmosphere, meaning not let the atmosphere be lost to the surrounding space. The Bessler principle could

produce enough power to keep the atmospheres of such planets from freezing. The produced power would be radiated away. Such situations would not be a puzzle until such excess radiation is observed and assuming people do not yet understand that the Bessler principle is correct. If people understand that the Bessler principle is correct, then upon observing excess radiation from such a distant planet it would not be a puzzle. If the mass of such planets in interstellar space increases enough, then their energy production can be that approaching that of a star. Mergers of such planets or accretion of matter into such can cause them to rapidly increase in radiant power production.

12~ Explanation of Cold-Fusion Energy-Production

The short answer for explaining all cold fusion related phenomena (that I have considered) is that the Bessler principle provides the required hidden initiation energy. To explain the large body of cold fusion results, we can use that fundamental hidden principle along with the idea that nuclei can rotate. In turn, the large body of cold fusion results (prior and continuing) gives much further evidence for the Bessler principle.

Name Confusion

I think that some confusion on a proper name for the field (cold fusion or Chemically Assisted Nuclear Reactions (CANR) or Low Energy Nuclear Reactions (LENR) or nuclear effects) has arisen from an incomplete understanding of the hidden root cause for the phenomena related to cold fusion. To say that there is a low energy nuclear reaction is partly a misnomer, since it is from the point of view of the LENR experimenter inputting a low amount of energy. From the hidden point of view of the rapidly rotating nucleus, there is large energy input curtesy of the two-part gravitons in LENR. The so-called hot fusion reactions have typically very low internal *rotational energy* of the input rotating nuclei. That means that the normal hot fusion reactions are actually cold from a standpoint of the extra rotations of the initial nuclear states. The names of hot fusion and cold fusion could effectively switch places, when we switch from a gross translational kinetic energy perspective to an internal *rotational kinetic energy* perspective prior to the nuclear reactions. Instead of cold fusion or CANR or LENR, I like the name Gravity Assisted Nuclear Effects (GANE), since it suggests assistance by the Bessler principle, using absorption of discrete two-part gravitons. The explanation for the phenomena should really be suggested in the name for the phenomena.

Many Cold Fusion Anomalies

I think that there is a simple explanation that applies across the wide spectrum of so-called cold-fusion-related nuclear effects. I think that all the cold fusion related phenomena/anomalies (or say CANR or LENR or GANE) can, in every case that I am aware of, be qualitatively explained by the interaction of rotating nuclei, as initiated or caused by the Bessler principle. I think that these two physical subtleties (there being rotating ground states of nuclei and there being a Bessler principle, which acts upon those rotating nuclei) are the extra things needed to account for this wide body of phenomena. I think that with a little imagination, one can explain much, when armed with correct principles. All that I have found

necessary to do is to ponder long enough the conditions of a cold-fusion related experiment or device until a plausible explanation comes forth, which may later be subject to experimental testing, according to the insights provided. Is there any sort of competing explanation for the wide body of cold-fusion-related nuclear effects?

Example Geometry

As an example of how the explanation process can proceed, we can consider the geometry of initial experiments advocated by Fleischmann, Pons, and Hawkins. We notice from the experimental geometry that the largest magnetic fields were horizontal and located at the boundary surface of the fully-immersed vertical-cylindrical-cathode. The conducting cathode is the negatively charged end. The produced magnetic fields are greatest at that cathode's boundary, since that is the minimum cylindrical surface of the cathode within which the greatest positive current goes up (by negative electrons going down). Other later studies suggested that the cold fusion was occurring near or at the cathode's surface.

An Explanation at Cathode's Surface. I think that there may be some lattice geometries at the cathode's surface, favoring squeezing together nearby pairs of nuclei of deuterium internally rotating about parallel horizontal axes. If there are two deuterium atoms forced into a tight lattice location, such that their parallel planes of rotation are in a single plane, then there can be a process of coalescence, which reduces the pressure or pushback from the surroundings as the nuclei begin to merge by greater internal rotation about horizontal axes. Because the largest horizontal magnetic fields are present at the surface, any positively charged nucleus of deuterium rotates only in one direction about a horizontal axis. See Fig. 7 above (or Fig. 47 on p. 187 of ***GWU***) for a rotating positive nucleus aligning in an external horizontal magnetic field, showing that the angular velocity of the nucleus points in the same horizontal direction as the external magnetic field. Again, for a definition, the angular velocity points in the same direction that an imaginary right-hand screw would travel, if so turned. Since the angular velocity is horizontal, the Bessler principle causes a nucleus to rotate more rapidly about a horizontal axis through its center. The common direction horizontal magnetic field, the parallel angular velocity of the deuterium nucleus, the attraction of the nucleons, and the Bessler principle cause the two nucleons within each deuterium nucleus to also have external (relative to the center of the two nucleons) and internal (relative to the center of a nucleon) angular velocities parallel to that same common direction. Because of the Bessler principle causing greater internally rotating nucleons to more rapidly rotate about horizontal axes (through the center of each nucleon), they cause each deuterium nucleus, as a whole, to rotate more rapidly about a horizontal axis through its center parallel to the common direction. A nucleon is either a proton (p) or a neutron (n). A deuterium nucleus may be considered as pn or np. A pair of rotating deuterium nuclei, which happen to be constrained to a common plane with surface normal parallel to all the parallel angular velocities, are squished together near the surface of the cathode. They may be considered as two separate circles $^{p}{}_{n}$ $^{n}{}_{p}$ in a common plane with each pair of p and n rotating about their deuterium center in a small circle.

Shielding of Coulomb Repulsion

There is Coulomb repulsion between the positively charged protons located in the rotating pn and np pairs of nucleons. As the separate compressed pairs rotate in small circles, a proton and a neutron of one small circle can quickly trade places by a rapid positively charged meson transfer to keep the protons of nearby small circles as far away from each other as possible. Such an exchange would cause an electron or (as typically thought) an electron cloud about one proton to be thrown inward toward the other pair of pn or np. This throwing inward of electrons (or more precisely many of the mainly negative finest most-fundamental charges which constitute electrons) would create a large charge shielding between them and allow the pairs to approach very close to each other despite the Coulomb repulsion. A river of negative most fundamental charges could be caused to flow or to be thrown from each disappearing proton in a rotating deuterium to the proton in the other rotating deuterium nucleus. Along with the external compression, there could be nearly some attraction between the rotating deuterium nuclei because of the negative finest fundamental charges in between, until the innermost neutrons are within the range of strong nuclear forces or rather the exchange of neutral mesons. For a slight analogy, a sling can send directed projectiles with pinpoint accuracy much better than a fan can blow moisture droplets in a cloud. The electron is not a probability cloud of the electron appearing but actually composed of many finest most fundamental charged particles (spirit matter) operating as a unified quantum entity.

Fusion by Rapid Rotation. Given favorable geometry, sufficient compression, sufficient rotations, and sufficient charge shielding, then I think that they could eventually form a rapidly rotating helium nucleus, pnnp rotating about a horizontal axis going through its center of mass. It would seem reasonable that with there being angular momentum in each of the rotating deuterium nuclei prior to the fusion, that there would be much angular momentum in the rotating helium nucleus after the fusion. I don't know how close the connection is between the two neutrons relative to the distance between a neutron and a proton.

Decay of Rotating Helium

An approximate "line" pnnp could rapidly rotate around its center of mass. There could be neutral meson exchanges, which would prevent the rotating neutrons from decaying. The two p nucleons could rotate in an outer circle, while the two n nucleons rotate in an inner circle. This rapidly rotating nucleus of helium (with protons on the ends) could produce much heat, as the elongated or stretched-out ground-state collection rotates or rather decays down to the normal ground-state nucleus of helium four. I suggested some details and two figures in my technical note, "Some Thoughts on a Simple Mechanism for the $^{2}H + {}^{2}H \rightarrow {}^{4}He$ Cold Fusion Reaction" ***Fusion Technology***, American Nuclear Society, Vol. 24, No. 3, November 1993, pp. 319-323. In my technical note, I drew the rapidly-rotating nucleus in those figures as rotating counterclockwise about horizontal axes, with all the axes or rather angular velocities coming out of the paper, with the horizontal magnetic field also pointing out of the paper (by imagining that we are looking at

Fig. 7 (or Fig. 47 on p. 187 ***GWU***) from the left edge of the figure). The rapidly externally-rotating end positive protons might tend to attractively collide with abundant negative electrons to produce many photons, thus allowing the rapidly rotating nuclei to decay down to the usual ground state nucleus of helium. Even during the decay, there is nonetheless some extra energy picked up by the rapidly-rotating nucleus from the Bessler principle, assuming that each nucleon also somewhat internally rotates about its center of mass.

Heat and Helium-4

I called the process compressed-rotational-shielded (CRS) fusion in my 1993 technical note. The decay down to a "normal" nucleus of helium can occur without any "typical" nuclear signatures of say gamma rays (or neutrons if it doesn't go to helium), since it can be a relatively stable fusion of two rotating nuclei of deuterium to form a rotating nucleus of helium. That is to say the decay may occur with only the production of much radiation (as electrons are hit by moving protons and the radiation often converted to heat) and the nuclear ash of the helium-4. There is not a production of a 23.8 MeV gamma ray, since the reaction is a combination of two rotating nuclear-ground-states of deuterium to form a rapidly rotating nuclear-ground-state of helium-4. A gamma ray means a very energetic photon of electromagnetic energy, often associated with a decay of an excited nuclear state. There can be no gamma ray given off in helium, if at its formation it is a rotating ground state. Many experiments have found heat and the nuclear "ash" of helium-4. For example, see "Heat and Helium Production in Cold Fusion Experiments" by M. H. Miles, B. F. Bush, G. S. Ostrom, and J.J. Lagowski, ***Proc. 2nd Annual Conf. Cold Fusion***, 29 June - 4 July 1991, p. 363, SIF (1991).

Expect Somewhat More Energy Produced

According to my discrete graviton theory, because of the additional production of excess energy by the internal rotation of nucleons (each either n or p) and nuclei about horizontal axes (rotationally hot or translationally cold fusion), according to the Bessler principle, one would expect to find somewhat more excess energy/heat than can be accounted for by purely the normal hot fusion (rotationally cold and translationally hot fusion) of deuterium plus deuterium to produce helium four ($^2H + {}^2H \rightarrow {}^4He + 23.8$ MeV). I understand that is exactly what is observed. See for example https://www.youtube.com/watch?v=KM82RW7_II4 "Anomalous Effects in Deuterated Systems Melvin Miles The Correlation of Excess Heat and Helium" Aug 2015. Miles found that there were not quite enough ^4He atoms to account for the much heat produced. He considered that some of the missing ^4He atoms produced could have been left behind in the cathode lattice. Given our knowledge of the Bessler principle, it should be obvious why there are not enough ^4He atoms/nuclei are found to completely account for energy/heat being purely produced from the energy coming from the fusion of deuterium nuclei. It is not just the fusion reaction of nuclei that is producing energy/heat ($^2H + {}^2H \rightarrow {}^4He + 23.8$ MeV) in cold fusion or LENR or GANE. There are many "gravitational reactions" or discrete "absorptions by gravity" occurring. Because of the extra assistance of energy production corresponding to the Bessler principle before and after the fusion process, there are

many rotating nucleons (each either n or p) and rotating nuclei of ^{2}H or ^{4}He or even some Pd (when using a palladium cathode) rotating about horizontal axes that are producing extra energy by absorption of two-part gravitons. By initial conditions favoring the rotations of deuterium nuclei about horizontal axes, extra energy is produced by the Bessler principle. Then later, after fusion, the rapidly rotating nuclei of helium-four also produce extra *rotational energy* by the Bessler principle, as it decays down to its normal ground state, with not much extra rotation.

Energy Not Conserved. One can be critical of the experimental evidence by saying that the results violate conservation of energy. Still, if energy is not actually conserved because of the Bessler principle supplying extra energy by reactions with energetic gravitons, then one should not be critical of the actual results. The actual results fit perfectly with the energy non-conservative theory. The experimental results provide further evidence for the energy non-conservative Bessler principle to initiate and complete translationally-cold fusion (or rotationally-hot fusion) reactions.

Why Explosions? Why do I think that Fleischmann, Pons, and Hawkins had the explosion that they warned against in their seminal paper? I think that the flat cubic surfaces of their cathode happened to have inordinately large geometrically-favorable regions with many nearby nuclei of produced helium-4 or productive deuterium pairs that were rotating extremely rapidly. The ground states of rotating helium or deuterium could not rely on their neighbors to rotationally cool them off, since the neighbors were also extremely hot rotationally. With the Bessler principle there was a runaway situation and hence an explosion. I think that there were many ^{4}He nuclei and possibly many ^{2}H rotating too rapidly about horizontal axes because of the Bessler principle. Some internally rotating Pd nuclei of the cathode could also contribute and not provide rotational cooling. Greater *rotational kinetic energy* is produced by the nuclei rotating about horizontal axes with great angular speed. It would need rapid rotational moderation to avoid an explosion. From the evidence left behind, a chemical explosion could not have caused it. The nonchemical explosion evidence reminds me of the two Papp explosions set off by Papp (referred to in the next section). I suspect that the Fleishmann, Pons, and Hawkins explosion was preceded by the curious rumbling noises that also had preceded the two explosions set off by Papp. See pp. 7, 16-17 of ***IE*** Issue 51 "… I heard that same rumble as when the cannon exploded." I suspect that a rumble would have been caused by many rapidly rotating nuclei rotating out of control about somewhat horizontal axes. The cold fusion explosion noticed by Fleischmann, Pons, and Hawkins was not the only nonchemical nonnuclear explosion. I say nonnuclear since there was likely no normal (rotationally-cold and translationally-hot) nuclear reaction, but rather it was gravity that aggressively rotationally ripped apart the rapidly rotating nuclei, which were rotating about horizontal axes. I have heard of other such nonchemical nonnuclear explosions associated with cold fusion or LENR or CANR or GANE.

More Traditional Signatures Possible

More traditional nuclear signatures (such as with neutrons or tritium appearing) can come from some cold fusion experiments. For example, such signatures can occur if rotating nuclei are allowed to interact in an asymmetrical or disruptive manner. Pairs of rotating deuterium nuclei must remain in balance so that neither a rotating deuterium pair has its neutron pulled off to make tritium nor has a neutron pulled off by itself.

Failure of Normal Nuclear Reactions Analysis. We must not neglect to consider the Bessler principle, as applied to rotating nuclei, when we want understanding of how "chemical" types of processes can supposedly induce or assist in causing many strong-force nuclear interactions. That is why traditional nuclear analysis fails to explain the new large body of interactions. The traditional nuclear physicist neglects to consider the seemingly inconsequential idea of the nuclei having very tiny amounts of internal angular speed, which can be cumulative and increased by the Bessler principle. The traditional nuclear physicist might say that a tiny fraction of an electron Volt of *rotational energy* is ignorable when typical nuclear reactions involve energies on a million electron Volts scale. The thought may have been, "Who cares about a tiny fraction of an electron Volt or even a few electron Volts when present both before and after a nuclear reaction?" The experiments are typically not even measured to such extreme precision. Well, to answer the "who cares" part of the question, one must carefully consider if there is some way to leverage such a slight energy into greater and greater energy. Yes, one must properly consider that many small and energetically weak things when accumulated together can become something very large and strong energy-wise. Consider these statements. In Doctrine and Covenants 1:19 it says, "The weak things of the world shall come forth and break down the mighty and strong …" In Alma 37:6 it says, "... by small and simple things are great things brought to pass; and small means in many instances doth confound the wise." In 1 Corinthians 1:27 it says, "But God hath chosen the foolish things of the world to confound the wise; and God hath chosen the weak things of the world to confound the things which are mighty;" Because of the Bessler principle, it is possible by "chemical" and other "non-nuclear" means to increase the slight energies of those rotating nuclei without there needing to be a "normal" large-translational-speed nuclear-reaction. Many small-angular-speed increases by the Bessler principle can accumulate into a significant situation with respect to *rotational energy*. Under the right circumstances, angular speeds about horizontal axes can slightly increase by the Bessler principle to become very large angular speeds. Thus, we have the possibility of nuclear-ground-states to nuclear-ground-state fusion. We can have two rapidly rotating nuclear-ground-states of deuterium combine to form a rapidly rotating nuclear-ground-state of helium-four, without any "typical" nuclear signatures other than two deuterium nuclei being converted to one helium nucleus. Cold fusion phenomena should be considered as the interaction of internally rotating nuclei by use of the Bessler principle.

11~ Explanation of Papp Engines

Why Perpetual Papp engines?

How did the Papp engines "perpetually" run, using reusable noble gases? The short answer is that the Bessler principle powered each Papp engine so that it could run "perpetually" using a reusable fuel of "noble" gases. High frequency sparks caused many protons to rapidly rotate about horizontal axes. The Bessler principle caused many nuclei, which were rapidly rotating about horizontal axes, to more rapidly rotate about horizontal axes. Noble gases provided rotational moderation, with some of their nuclei also acquiring angular speed about horizontal axes. Rapidly-rotating positive nuclei attracted negative electrons, which produced photons when struck by the rapidly rotating nuclei. Reflections of photons off a small-mass piston provided to the piston approximately double the photon's outward momentum, upon each reflection. The most kinetic energy was delivered when the piston had approximately its maximum outward speed. With many internal reflections in the spark chamber allowing each photon to reflect off the piston many times, the piston acquired much kinetic energy during the working of the Papp engine. Each Papp engine was a photon powered engine/reactor powered by two-part graviton reactions. See section "Papp Engines" on pp. 159-174 of ***GWU*** (18 March 2019) for my prior more lengthy explanation of the Papp engines.

Explosions with Greater-than Chemical Power?

What gave Papp's noble gas greater than chemical power during explosions? Similarly, the short answer to the explosions question is that the Bessler principle simply caused greater than chemical power to be manifested in the two cases of explosions of Papp gas. In those cases, I think that the Bessler principle was allowed to rotationally rip apart many nuclei, providing much energy. There was almost no attempt to control or moderate energy production during those explosions. In both explosions, I think that there was insufficient rotational moderation of the Papp gas relative to the input high frequency energies used to initiate the explosions. The explosions of the Papp gas gave evidence for the Bessler principle.

More Details Below. You should continue reading this section, as long as you desire more details, about the operation of Papp engines.

Papp Engines Introduction

The Papp engines used the Bessler principle to produce large amounts of *rotational kinetic energy* from induced rapidly rotating nuclei. The Papp engines ran very cool, because they created internal rotational states of matter rather than translational states of moving matter. Radiation was milked of its energy so as not to increase the translational temperature. There was no need for a cooling system and Joseph Papp didn't use one. Papp had the opposite problem of the system being too cold. The inside of a Papp engine can be thermally/rotationally very cold because of rotating nuclei only giving up *rotational kinetic energy* and magnetic radiation in a rotational-frictional fashion, without much translational friction. The situation is not completely unlike the rotationally cold protons in ultra-cold 3°K

space giving up magnetic radiation so as not to increase in angular speed according to the Bessler principle. Papp built and demonstrated separate engines.

Bessler Principle Power Source Withheld. Papp didn't credit the Bessler principle as the source of power. Like Bessler, Papp was continually battling or confronting a great wall of disbelief, especially on the part of so-called "scientifically knowledgeable" people. I think that Papp caused some of his own problems, since I think that he left out important essential details in his patents (#3680431, #3670494, and #4428193) which should have well described portions of his engines. (See https://www.freepatentsonline.com/3680431.pdf, https://www.freepatentsonline.com/3670494.pdf, and https://www.freepatentsonline.com/4428193.pdf) I think that Papp was trying to maintain control of his engine, as one does with a trade secret. I don't think that he provided full disclosures of his inventions, as one should properly do to get a patent. How do I know these things? I knew about the Bessler principle and it seemed reasonable that he actually used the Bessler principle to provide a Bessler principle solution. I saw that he was a little tricky in his dealings with some people so I simply looked to see what was left out to provide a full Bessler principle explanation. Papp vaguely referred to nuclear sources of power, when he should have more properly attributed it to something like the Bessler principle or rapidly rotating nuclei especially powered by gravity, when the nuclei internally rotate quite rapidly. Still, properly attributing the source of power to something like the Bessler principle might have increased the wall of disbelief by those so-called "scientifically knowledgeable" people because of their great ill-informed disbelief of things like the Bessler principle.

Hydrogen Left Out of Noble Gas Formula

The Papp patents neglected to explain that ordinary hydrogen is a necessary ingredient for the reusable "noble" gas "fuel" mixture for the Papp engines. I will try to explain below why hydrogen was so important to the proper working of Papp's noble gas engines. Papp's stated noble gas fuel mixture was approximately 36% helium, approximately 26% neon, approximately 17% argon, approximately 13% krypton, and approximately 8% xenon by volume, which percentages add up to 100%. This fuel mixture formula may be found in patent #4428193 and also may be found on p. 28 of ***Infinite Energy*** (***IE***) Issue #51.

Hydrogen in Revised Formula. The fuel mixture may be corrected by the addition of diatomic hydrogen, by somewhat maintaining the same neighboring ratios, 1.38=36/26, 1.53=26/17, 1.31=17/13, and 1.62=13/8, of the number of lighter nuclei to the number of next more massive nuclei. The average of those ratios would be approximately $1.5 \approx 1.46 \approx (36/26 + 26/17 + 17/13 + 13/8)/4 \approx (1.3846 + 1.5294 + 1.3077 + 1.625)/4 \approx 1.46 \approx$ Median(1.3846, 1.5294, 1.3077, 1.625). This would for example give a revised Papp gas formula of approximately 21.3% hydrogen, 28.3% helium, 20.5% neon, 13.4% argon, 10.2% krypton, and 6.3% xenon by volume, assuming a ratio of 1.5 between the number of hydrogen nuclei and the number of helium nuclei. With the first assumed ratio of 1.5=2*21.3/28.3 the other ratios of 1.38=28.3/20.5, 1.53=20.5/13.4, 1.31=13.4/10.2, and 1.62=10.2/6.3 are

approximately the same as before. There could be various other formulas, if other ratios of hydrogen nuclei to helium nuclei were assumed. The last digit (in the tenths place of the percentages) is not significant for the above revised formula but I included it, since the corrected percentages by volume happened to add up to exactly 100.%. The diatomic hydrogen molecule contains two hydrogen nuclei, which is why the percentage for hydrogen is not double the value that we might think that it should be, if we only counted molecules. We only count molecules, when we measure gas by volume, assuming the gas is approximately "ideal". In the plasma state, the diatomic hydrogen molecules tend to be ripped apart so that counting atoms or ionized atoms or nuclei would be equivalent. I don't know if there needs to be even more hydrogen in the formula. Future experiments may clarify the situation, using the Papp patents and using other details that he left out. I am assuming that Papp provided the correct frequency for the sparks in his patents, since he left out enough other things to ensure that he was the only one who could get his engines to work, until others figured out what he withheld.

Other Formulas Based on Constant Ratios of Neighboring Nuclei. Some other gas mixture formulas may be found according to using as a constant factor (f) or ratio of the number of the lighter nuclei to the number of next more massive nuclei. A fixed factor (f) might have been selected between 1.3 and 1.7, since those numbers formed bounds on Papp's prior ratios. Any chosen fixed factor (f) would produce a "noble" Papp gas formula of (.5*f^5H_2, f^4He, f^3Ne, f^2Ar, fKr, Xe)(100%)/(.5*f^5+f^4+f^3+f^2+f+1). In that and the similar formula on p. 161 of ***GWU***, I should have used H_2 as I do here to better remind the reader that we are talking about molecular or rather diatomic hydrogen. As an example of using that formula, choosing as f the fixed ratio or factor of the average ratio of Papp's stated neighboring ratios = (36/26 + 26/17 + 17/13 + 13/8)/4 ≈ 1.46 would have produced a formula of approximately 21.4% hydrogen, 29.2% helium, 20.0% neon, 13.7% argon, 9.4% krypton, and 6.4% xenon by volume, which adds up to 100.1% or 100.% if we round the last digit, which wasn't significant. This example formula is quite close to the prior revised formula (or as we compare 21.3% ~ 21.4% hydrogen, 28.3% ~ 29.2% helium, 20.5% ~ 20.0% neon, 13.4% ~ 13.7% argon, 10.2% ~ 9.4% krypton, and 6.3% ~ 6.4% xenon). Other formulas (found from other factors of f) could be used, which might better perform, given particular spark characteristics and particular spark chamber rotational cooling characteristics. Performance could include power production but one must consider safety as one evaluates performance.

More Study. We could also study a more detailed dual parameter formula such as (.5*kf^4H_2, f^4He, f^3Ne, f^2Ar, fKr, Xe)(100%)/(.5*kf^4+f^4+f^3+f^2+f+1). As a caution during studies, we must not purely optimize power production, and then later learn that we traded off safety for reasons of improved power production. I would initially recommend k=f=1.46 as I effectively showed that formula above to somewhat stay reasonably close to what Papp indicated.

Papp did not include Rn or radon in his formula because it is not naturally occurring, since all isotopes of it decay away.

Angular Acceleration of Nuclei. Without consideration of the additional angular acceleration from the Bessler principle, a nucleus may receive an initial angular acceleration proportional to the ratio of its received torque to its moment of inertia. The torque applied (about its center of mass) by a spark is proportional to its currently induced nuclear magnetic-dipole-moment.

Most Easily Rotated Hydrogen Essential for Power Production. The most important thing in the fuel mixture formula is that ordinary hydrogen is needed for proper power production. The nucleus of the ordinary hydrogen atom (a proton) is the nucleus with the largest ratio of nuclear magnetic moment to moment of inertia. The proton has a very large nuclear magnetic moment of +2.79278 nuclear magnetons (see p. B-247 of ***CRC***). The proton is not the nucleus with the largest nuclear magnetic moment but the proton is the nucleus which has the greatest ratio of nuclear magnetic moment to moment of inertia. The moment of inertia of a solid sphere about an axis through its center is (2/5) times its mass times the square of the sphere's radius. Among all nuclei, the mass of the proton is the smallest. Among all nuclei, the radius of the proton is the smallest. Among all nuclei, the moment of inertia of the proton is the smallest. Among all nuclei, the proton contained in hydrogen is most easily rotated. The proton is the "King" nucleus with respect to being the most easily rotated.

Rapidly changing magnetic fields in sudden high frequency sparks from electrode pairs can cause many nuclei of hydrogen to very rapidly rotate about an axis going through its center. The Papp patent #4428193 indicates frequencies from approximately 27,000 MHz to approximately 40,000 MHz.

Hydrogen Almost a Noble Gas. Once the plasma is formed by the patent-specified high-frequency-spark(s), many of the hydrogen nuclei (protons) would potentially be available for power production. In that mixture, hydrogen is "almost" a noble gas. It can only chemically combine with itself. Hydrogen can't chemically combine with any of the noble gas atoms. There must be no oxygen in the Papp gas, since it would provide a one-time production of energy and would remove some hydrogen from being available in the gas. The chemical energy associated with atomic hydrogen repetitively combining and disassociating with itself is effectively a zero-sum energy situation in the long run. Papp was essentially right when he said he was using a noble gas fuel mixture. He was just being a little tricky, when he withheld that complete detail concerning hydrogen. I am not saying that hydrogen has a closed atomic shell, since it doesn't. I am saying that it maintains its chemical purity by itself in the presence of noble gases. In this special restricted setting, it is close to being a noble gas. It doesn't react with anything else.

Proton Almost a Noble Nucleus. Also, from a nuclear perspective hydrogen or rather the proton within might be considered almost noble. It is not noble from the limited perspective of it not having a closed nuclear shell. Closed nuclear shells are stable and they have much stability from being destroyed by internal rotation. From a purely rotational perspective the proton is the nucleus best able to withstand destruction by great internal rotation of its nuclear ground state. It has such impressive stability that no other nucleus can be rotated as rapidly as it can

and not be ripped apart into nucleons. I think that rotational stability is the significant often-ignored issue for noble nuclei. The proton (nucleus of hydrogen atom) is the most rotationally stable nucleus of all nuclei, which greatest rotational stability is much better than having a closed nuclear shell. It is the important "King" of rotational stability, which king is more of a royal nucleus than merely being a noble nucleus.

Proton Is a Double Crowned King. The proton is not only the "King" with respect to being the most easily rotated nucleus but it is also the "King" with respect to being the most rotationally stable nucleus. For Papp engine utility depending upon rotations of nuclei, being a doubly-crowned king nucleus is much more of a royal nucleus than being a single-crowned king nucleus for rotational stability, which is more of a royal nucleus than merely being a noble nucleus. I think that people should not question the "royal" lineage of the lowly proton as used in the Papp noble gas engine, since the proton is a doubly-crowned king nucleus.

Danger of Insufficient Rotational Moderation

If we get the somewhat more massive nuclei in the gas mixture to rotate, they can provide much energy by the Bessler principle, but there is a great danger of those nuclei being ripped apart rotationally (by acquiring too much energy) if they are somehow not sufficiently rotationally moderated. The solution is to not make the Papp engines too powerful.

Explosions with Insufficient Rotational Moderation. Both explosions in 1968, of the Papp gas, were caused by insufficient rotational moderation along with too much initial power supplied. In the first case there was a demonstrated explosion and in the second case (the next month) there was an unplanned explosion, possibly associated with anger on the part of the inventor.

Demonstrated Explosion. The first explosion demonstrated the greater than chemical explosive power of the Papp gas. The explosion was on 27 October 1968 in the desert east of Lancaster, California. See ***IE,*** 2003, Volume 9, Issue #51, pp. 7, 17, 37-40, 43.

Unplanned Explosion. The second explosion was not planned on 18 November 1968 in Gardena, California during a demonstration of a running Papp engine, in which there were injuries and a fatality. See ***IE*** Issue #51, pp. 7-8, 29-30, 33-36, and 39-48.

Rotational Moderation Needed. The Papp patents neglected to directly explain that rotational moderation was needed to avoid too much power being produced. Beyond the need for hydrogen, the next most important thing in the fuel mixture formulas (and their surroundings) is that there must be enough surrounding nuclei of large enough mass so that the surroundings can be rotationally-moderating. Those surrounding materials need to be chemically inert so that the materials continue to be available for later rotational moderation. The walls/piston can for example be an inert shiny stainless steel alloy or an inert shiny strong alloy of aluminum or a shiny inert metal covering a strong material. The surfaces contain many atoms with nuclei, which may have large nuclear magnetic moments to provide extra rotational moderation. The surfaces are not required to

have large nuclear magnetic moments, since nuclei/ions/atoms bumping into them will usually provide some rotational moderation. The chemically inert massive walls of the spark chamber can serve as rotational moderation, but they are often distant from the rotating nuclei. There needs to be enough massive nuclei going nearby for local rotational moderation of the lighter nuclei.

Rotational Moderation within Explosive/Plasma. How does rotational moderation occur within a Papp gas or plasma? Nuclei of all sizes can have induced magnetic dipoles because of internal rotations of their positive charges, even if they don't normally possess a nuclear magnetic moment. Because of translational motion, lighter nuclei can have their rotational directions changed, when their magnetic dipoles come close to magnetic dipoles of larger nuclei. Atoms/ions coming near other atoms/ions can provide internal rotational bumping or moderation to prevent lighter nuclei from rotating purely about horizontal axes. The suppression of rotation about horizontal axes prevents the acquisition of greater *rotational kinetic energy* by the Bessler Principle. If the larger nuclei within noble gas atoms only have small angular speeds, then they can still have larger magnetic dipoles because of their many positive charges, so they may still do rotational moderation, as long as their angular speeds are not too small and their translational motion is not too small.

It would be unlikely, except initially or under very cold circumstances, for all the most massive nuclei to have little internal rotation of their nuclei (and thus little induced magnetic dipole moments). If the nuclei are to remain effective with respect to rotational moderation, that is a reason for preventing such nuclei from becoming rotationally and translationally too cold.

Little Rotational Moderation during Run-away Situation. With little rotational moderation, it could promote a rotationally "run-away" situation, with nearly-all nuclei increasing in internal angular speed about somewhat horizontal axes, because of the Bessler principle. There could be a rumbling sound followed by an explosion, if insufficient local rotational moderation is provided and if too much power is provided. See ***IE*** Issue #51, pp. 16-17 for details of the low-frequency rumbling sound preceding explosions on two occasions. If we want to maintain rotational moderation, hopefully we can prevent all nuclei from being too cold with respect to translation. The nuclei need to magnetically interfere with each other to properly be rotationally moderating.

***Rotational Kinetic Energy* to Photons.** Energy is also removed from rapidly rotating nuclei by various forms of rotational "friction". Electrons can especially acquire energy by interacting with rapidly rotating nuclei and so produce photons which convey away energy and momentum. Some radiation can also be produced when a nuclear magnetic moment happens to correspond to another axis than that associated with rotation of the nucleus as a whole. Radiation given off will typically slow down the angular speeds, though the Bessler principle can increase the internal angular speeds for rotations about somewhat horizontal axes.

Reflection Doubles Momentum Transfer

I think that the Papp patents also neglected to explain that the inside surfaces of the spark chamber should best be reflective with respect to the produced photons. When a photon is purely absorbed in a piston, it would at most change the momentum of the piston by the momentum of the photon. When a photon is reflected by a piston, it can change the momentum of a piston by up to approximately twice the initial momentum of the photon. A photon's linear momentum in the direction that it is going is the photon's energy divided by the speed of light. The speed of light may be represented by c which is also equal to (a photon's wavelength)*(the photon's frequency). The reflecting photon itself loses no energy, if it is reflected from a "completely" stationary piston or surface. Upon reflection, the photon's momentum toward a stationary surface of the piston changes from a positive component to a negative component of the same amount. Conservation of total linear momentum, for a head on reflection, would require that the piston acquire approximately double the momentum component that the photon originally had.

Multiple Reflections Multiplies Momentum Transfer. Making all the inside surfaces of a spark chamber in a Papp engine very reflective could cause each photon to usually come back and hit the piston again. With each return of the photon to the piston surface, that would repeatedly provide nearly double components of photon momentum to the piston. This is somewhat in analogy to there being large numbers of light source images, when an original light source is placed between opposing highly reflective mirrors. When one stands in a lighted room between parallel large mirrors on opposite walls, one can see multiple images of one's self. Each of the image light sources is visually greatly multiplied. It can be extremely bright inside a container containing just a single light source, if all the inside surfaces of the container are perfectly reflective.

Slight Loss of Photon Energy by Reflecting off Receding Piston. For simple approximate analysis, in the frame of an initially moving piston wall (where there is much interaction), there is almost no loss of photon energy by reflection. In the frame of the Papp engine there is a slight loss of photon energy by it reflecting off an outward moving piston wall. A large number, of reflections of a photon off an outward moving piston, gradually degrades the energy and momentum of the photon. Upon each reflection from an outward moving piston it delivers to the piston nearly twice its surface normal component of its most recent momentum. By the photons reflecting from the surfaces, they would not be absorbed (so not to increase the temperature of the walls). This would also help the Papp engine to run cool, as energy is slowly lost from the photon without the lost energy being deposited in the engine, while approximately large multiples, of the photon's momentum, are transferred to the piston. The reflective properties of the surfaces may need to be carefully chosen so as to preserve the largest total momenta available. If a photon didn't lose much momentum upon reflecting off a moving piston, then the photon would almost deliver to the piston twice its normal momentum component times the number of its reflections off the piston. Twice a

large number of reflections can more than greatly compensate for each slight loss of momentum upon each reflection off a receding piston. Whether we are or are not dealing with total energy conservative situations here, we are dealing with strange situations with respect to momentum.

Slight Gain of Photon Energy by Reflecting off Approaching Piston. Photon momentum would actually increase because of reflection off a piston when the piston travels toward the photon, but we will shortly see that such would destroy piston kinetic energy, which situation should be avoided during the normal operation of an energy productive Papp engine. Loss of piston kinetic energy might be useful in providing vehicle braking.

Photons Deliver Kinetic Energies by Momenta. The approximate total momentum delivered to the piston by reflected photons is approximately twice the sum of the normal components of the momenta of all the photons striking the piston. Suppose that a photon somehow delivers positive momentum of $P > 0$ to a piston. Assuming the positive direction (near the piston) is outward from the chamber of photons (increasing as it goes into the piston from the photon chamber), suppose V_2 is the velocity of the piston after the photon delivers momentum to the piston and suppose V_1 is the velocity of the piston before the photon delivers momentum to it. The photon delivers that momentum to the piston of P = (mass of piston)*(V_2-V_1) > 0. We will soon show that this changes the kinetic energy of the piston by PV, where V is (V_2+V_1)/2 or the average of the velocities of the piston before and after the photon delivers positive momentum of P. By doing some math, we see that PV = (mass of piston)*(V_2 - V_1)*(V_2 + V_1)/2 = (mass of piston)*(V_2*V_2 - V_1*V_1)/2 is indeed the change of the piston kinetic energy. That is what we said we would show. From this formula, PV = (mass of piston)*(V_2*V_2 - V_1*V_1)/2, we see that, for a given fixed positive momentum $P > 0$ delivered, the maximum kinetic energy is transferred to the piston when the piston is moving outward away from the photon chamber at the greatest positive average velocity, V = (V_2+V_1)/2. We also see that, for a given fixed positive momentum $P > 0$ delivered, the maximum kinetic energy is removed from the piston, when the piston is moving inward toward the photon chamber at the most negative average velocity, V = (V_2+V_1)/2.

Photon Reflection Detail Withheld. Papp didn't explain that his engine was photon powered, using photons reflecting off the surface of the piston. If he had explained the detail that his piston needed to reflect photons, then people might have understood that his engine was photon powered. All the interior surfaces of the spark chamber need to be reflective.

Spark Timing

The above calculations for a photon powered engine would suggest that a well-timed spark would be needed. Also see on p. 16 of ***IE*** Issue #51 wherein Joseph Papp actually said, "well-timed spark". A spark should be produced a little before the piston has its maximum outward speed. There needs to be a little time for the spark to create rotating nuclei, a little time for the Bessler principle to increase the energy of many of the rotating nuclei, a little time for the rapidly rotating nuclei to produce photons, and a little time for photons (including reflected photons)

traveling at the speed of light to deliver their momenta on hopefully multiple occasions. Due to the rapid nature of such events, some of those times may be nearly concurrent with other such times.

Timing Detail Withheld. Papp neglected to explain that the spark needed to be delivered just before the time that the piston was traveling outward with the maximum speed. If he had explained that curious detail, then people might have understood that he was speaking about a photon powered engine. People might have known that his engine was quite unusual.

Photon Power to Piston. With a photon's average outward-normal positive-momentum-component to a piston being P, the photon reflects many times from the piston of maximum outward velocity, of approximately V, then it delivers to the piston a total kinetic energy of about 2PV*(the effective number of normal reflections off the piston). The delivered kinetic energy greatly increases, as the number of reflections of that photon greatly increases. The formula holds for every total mass of the piston. It might be wise to use light-yet-sturdy reflective pistons so that less energy is needed to move the piston. Because of the many possible reflections of a photon, the photon's momentum is definitely not conserved. Is energy conserved in the process? I think we could argue both ways. I think we could argue yes from a macroscopic viewpoint and no from an ultra-microscopic viewpoint. The energy of a particular photon at a particular time is a fixed value of h*(the frequency of that photon). Recall that the symbol "*" represents times or multiplication. The proportionality constant, h, is Planck's constant. The momentum of a photon is h/(the wavelength of the photon) or h*(the frequency of the photon)/c.

Piston Kinetic Energy Destruction. The kinetic energy is most reduced (by PV being negative) in the piston when a photon delivers outward positive momentum, P, to the piston at the time when the average velocity, V, corresponds to the maximum inward piston speed (V is most negative). In other words, that is a time that a photon delivers outward momentum to the piston would be most destructive of the piston's kinetic energy. Outward momentum is applied to a piston, whose momentum is most inward. Such a piston would have some of its kinetic energy destroyed by it being slowed down in speed by the photon's delivered momentum.

Papp Engine Braking. A Bessler-principle-powered, photon-powered Papp engine should not be run in such an energy destructive manner, unless one wants to use the photons to provide braking for the engine or vehicle that is being powered. An example of desired energy destruction occurs when one is pulling a massive trailer down a hill. Rather than sending all the so-called "gravitational potential energy" of the trailer to the brakes to potentially burn them out or rather than sending all the energy to a normal engine, to be absorbed as spread out engine friction, instead a versatile Papp engine can destroy piston kinetic energies by applying the sparks to the engine at the "wrong" time of just before the pistons are moving inward at the maximum velocity. One might want to use low energy sparks during braking, since those photons would be increasing rather than decreasing in

frequency/energy, as they reflect off the inward moving pistons. A photon might be absorbed upon there being enough reflections, especially if the photon frequency increases so much that there happens to be greater absorption at the larger frequency.

Use Warming Coils

Papp did mention that there should be warming coils (see p. 23 of ***IE*** Issue #51). It would not be wise to have photons from any warming coil bouncing around at or before the time of maximum inward piston speed. In other words, if possible, it might be advantageous to turn off any warming coil well prior to the piston moving inward at the maximum inward speed, especially if those photons are being reflected off the interior surfaces. I doubt that long-lasting warming coils can be turned off fast enough due to residual heat lingering in thick coils. For warming coils to last a long time, I would think that they would need to be thick.

Rationale for Warming Coils Withheld. Papp didn't explain why his engine, unlike normal engines, needed to have warming coils.

Warming Photon Absorption. If the infrared photons from the warming coils happened to be absorbed in the walls, and not reflected, then that would in part avoid the problem of excessive reflections of infrared photons at the wrong time.

Lubricant Getting Too Cold. There might have been a problem with the lubrication in the Papp engine not working, if the Papp engine became too cold. Having too much friction (associated with a lubricant not working) would destroy much energy acquired.

Reflective Lubricant. If a lubricant is required in the Papp engine to reduce friction between moving nearly touching parts, I think that the lubricant should best be reflective for the most energy productive photons. The lubricant could absorb infrared photons coming from the warming coils. Except for the hardening of any lubricant when too cold, the Papp engine should run quite clean.

Low Friction Roller Bearings. Using any new sort of especially-low friction roller bearings for rotations and rubbing avoidance, might allow lubricants to be avoided, which could allow very clean Papp engines. Clean interiors of Papp engines would allow the interior optical properties of the "explosion" chambers to be maintained for very long times. Hopefully no lubricant would be necessary, if the piston never quite touches the walls.

Blacken Leak Routes

The sides of the piston could be black (or photon absorbing) so as to help prevent photons from leaking by the piston to the other side and so switch from being energy productive to energy destructive. Alternate routes for transfer of the gas between sides of the piston can contain corner reflector to reflect photons back into the cavity that they came from. Sides of the gas passageway could be black (especially when beyond the corner reflector) to help inhibit photons going from one side to the other. The passageways should be photon absorbing, if the photons manage to get past the corner reflectors in Papp engines.

Alternate Heating Rationale

Another reason for heating the Papp gas in the Papp engine might be to avoid nuclear magnetic moments all aligning in the same direction, which might cause an all or nothing response from the high frequency sparks. Some Papp engine designers might desire that prior to the high frequency sparks that the magnetic dipoles be aligned to maximize power produced. Heating might keep some nuclei rotating internally. Heating might also allow the larger nuclei to have different directions of their magnetic moments, which might allow them to better rotationally moderate the angular speeds of smaller nuclei. Rotational moderation of smaller nuclei might be enhanced, if such smaller nuclei have large enough translational speeds or temperatures so that they may come into close proximity "contact" with the larger rotationally-moderating nuclei.

Cold Rationale for Papp Engine. Here are some collected reasons why Papp engines might tend to run cold or rather why Papp engines have low temperatures. Low temperatures are usually associated with small translational speeds of atoms. Some of the reasons "blur" into other reasons or rather are related to other reasons.

(1) No Heating from Chemical Reactions. Papp engines run cold, since there are no chemical-powered reactions for heating or translational motion. There are essentially only gravitational-powered reactions producing useful *rotational kinetic energy* in Papp engines. The Bessler principle absorptions in nuclei of two-part gravitons cause there to be extra rotations of the nuclei about horizontal axes. Any chemical cooling from the disassociation of hydrogen molecules nets out as zero energy gains, after the hydrogen molecules are chemically re-formed. The Papp patents did correctly imply that the power did not come from combustion, but they incorrectly identified where the power was actually coming from. Papp either did not fully understand the Bessler principle or he was keeping his knowledge to himself.

(2) Reflections Don't Absorb Energy into Surfaces. Reflections of photons off the surfaces do not increase the heating of the surfaces, since reflected photons are not absorbed.

(3) Photons Slowly Lose Their Energy. The energies of the primarily produced photons tend to be gradually-non-thermally depleted by reflections off of receding piston surfaces. Many multiples of the normal component of momentum of the photon are delivered to the receding piston, which increase the piston energy, without photon energy typically being diverted to thermal energy in the process.

(4) Radiation from Rotating Nuclear Magnetic Moments. Hydrogen (with a nucleus of a proton) is the most rotationally stable nucleus. Even without extra rotation of the proton as a whole, I think that the proton has net intrinsic rotations about an axis which provides its large inherent nuclear magnetic moment. There can be some similarities of Papp engines to the very cold background of space. Rotations of protons can especially radiate away magnetic energy, when their nuclear magnetic moments are rotating about other axes. When the axes are the same and no extra rotations provided, there is still radiation of at least magnetic fields. The radiations of magnetic energy are low energy photons. Those radiations

of changing magnetic energy cause the protons to give up internal *rotational kinetic energy*. They radiate magnetic energy until they attain nearly non-rotations except for the intrinsic rotations associated with their having nuclear magnetic moments. Out in space, protons can become rotationally extremely cold (both with respect to translations and rotations). In the Papp engines, they don't become that cold because the earth's gravity provides them with extra rotational speed by the Bessler principle. Without external heating by warming coils, the Papp gas can become quite cold when the hydrogen nuclei give up much *rotational kinetic energy*.

(5) Translational Cooling from Partial Translation Constraints. If hydrogen and the noble gases are somewhat locked into a magnetically spatially stable structure, then it could tend toward translational stability. If attained, which I doubt could fully occur, then that would mean that it would tend to be translationally extremely cold.

(6) Papp Gas Doesn't Absorb Photons. Hydrogen and the noble gases are transparent for optical frequencies, so the presence of optical photons should cause very little motions of those atoms. It is supposed that those gases are relatively transparent for somewhat lower than optical frequencies, because the Papp engines ran cold, requiring a heating element to keep them warm.

(7) Little Friction by Not Rubbing. If the pistons are constrained to either not physically touch their containing cylinder walls or have very low friction contact with the piston walls, then there would be little or no friction from rubbing.

(8) Relative Cooling from Rotational Moderation. Any gas-particle translational motion may contribute to internal rotational moderation and "relative" cooling, because of interference of nuclear magnetic-dipole-moments. Interference generally keeps temperatures much less than what they would be if they have little rotational interference. Rotational moderation was discussed earlier. Translational motion of dipoles of nuclei with interference may sooner or later give up some energy of translation to weak magnetic photons in part because of altered internal rotations of gas nuclei.

(9) Much Compression Avoided by Alternate Routes. Compression of spark chambers (associated with piston motion) typically does not lead to heating, when there are alternate flow routes for Papp gas between chambers.

(10) Slight Expansion Cancels Slight Compression. Any extra slight compression/heating is later nearly canceled by slight expansion/cooling.

Rotational Moderation Using Noble Gases

Noble gases are mainly used for rotational moderation so that the rotating nuclear-ground-states in the Papp engine graviton reactions are not rotationally dangerous. The noble gases are both chemically inert and rotationally stable (with respect to their nuclei). The noble gases tend to be both chemically stable closed atomic shells and nuclear stable closed shells. It is assumed that high frequency sparks that are used are not so powerful that the noble gases internally rotate so rapidly that the nuclei will be rotationally ripped apart (by acquisition of excessively large amounts of *rotational energy* by the Bessler principle). Rotational moderation completely fails in that self-destructive physical regime so one must

stay completely away from there so as not to destroy the Papp engine as Papp once did.

Reuse Gas in Two-Stroke Papp Engine

There is no need to replace exhausted gas in such a two-stroke engine, as there is no chemical combustion in the "fuel" mixture. The "fuel" mixture may be simply reused, since both sides of the piston are collectively nearly hermetically sealed, given that gas flows from one side of the piston to the other. The Papp "noble" gas only needs to be replenished at a very slow rate, according to the rate that it leaks away. The piston can acquire power from photon pressure (with chamber expansion). With the chamber expansions and contractions, gas should be routed from one side of the piston chamber to the other so there is little problem of pressure differentials. That might most easily be done by making the pistons leaky at their edges, which could help avoid friction if the surfaces are not in contact, but could create a slight problem of photons lost through the edges.

Multi-stroke Engines. Normal combustion engines have four-strokes with one of them being a power stroke. The usual internal combustion engines have these stages/strokes of piston motion: intake, compression, power from ignition, and exhaust. The stages/strokes respectively correspond to expansion, contraction, expansion, and contraction. Two-stroke combustion engines are possible with every other stroke being a power stroke.

Two-Stroke Papp Engine Information Withheld. Papp didn't emphasize that his engine could be most easily used in a two-stroke power mode, with every other stroke being a power stroke.

Single-Stroke Papp Engine

With sparks on each side of the piston, with approximately one atmosphere of the "noble" gas mixture on each side, and with reflective pistons not tightly sealed (to reduce friction and to allow some gas to get through to the other side but hopefully not lose too many photons), it might be possible for the Papp engine to effectively become a single-stroke engine. It could have a power stroke as the piston goes up and a power stroke as the piston comes down. The pistons could instead go from side to side but up and down might be easier to support. In either case, there could be at least one very-low-friction roller bearing on each of the sides of pistons to provide tiny gaps. Every stroke could be a power stroke in such a Papp engine. Just apply the high frequency spark on the side of the piston just before the piston on that side is receding the most rapidly. There could be some extra reflections of photons from the surfaces of supports on the side having the piston supports. The piston supports should be as reflective as possible to minimize loss of photons. Preferably the piston surfaces should be locally normal to the piston motion direction. The piston supports might also somewhat rotationally cool off the gas on that side so that side might need more energetic sparks. One would not need to build a Papp engine with controlled "noble"-gas explosions on each side, but in principle it could be possible to build such an engine, with every stroke being a power stroke. I would recommend that the Papp engines be single stroke engines.

Single-Stroke Papp Engine Information Withheld. Papp never explained that his engine could be adapted to a one-stroke power mode, with every stroke being a power stroke.

Single-stroke Papp Engines Help Warming. A single-stroke engine might also be beneficial, since the reduced cooling times and the separate high frequency sparks (which help generate many energetic photons) might begin to replace the role of Papp's warming coils needed to keep things in the engine from becoming too cold. The idle time of the "cooling" phase might be completely removed by switching from a two-stroke Papp engine to a single-stroke Papp engine. Such changes might even help a single-stroke Papp engine, to use less energy for warming coils than two two-stroke Papp engines. Thus, a single-stroke Papp engine might not only be a more powerful engine than a two-stroke Papp engine but also it might be less likely to become too cold.

Use Single-stroke Papp Engines. I recommend that the single-stroke Papp engines be used to avoid fuel consumption and to provide versatile power sources. I would recommend that such Papp engines be used to power flying vehicles and all sorts of land based vehicles, such as cars and trucks. Motorcycles might practically be limited to one or two Papp pistons. The Papp engines could also be used to replace all sorts of power plants. They could be used for backup power supplies and for people wanting to have off-grid sources of power, though they may need occasional sources of Papp gas to replenish their reservoirs. If the Papp engine and its power production are somehow positioned within nearly a hermetically sealed container for special applications, then that would reduce the loss of Papp gas to the loss occurring during engine maintenances.

Multiple Sparks on a Side. For single-stroke Papp engines, more than one high frequency spark might be desired on each side. More than one spark may especially be necessary on the piston support side to more fully rotationally activate the nuclei. Even on the side without a support, more than one spark may be useful to more fully rotationally activate more nuclei.

Energy from Large Angular Speeds

The Papp engine would never have large energy productive times, if there were only a large forced redistribution of internal-angular-speed or "helpful working wealth" of the nuclei. It is the newly created large angular speeds of the nuclei that provide by the Bessler principle the great energy prosperity for the Papp engine. The largest angular speeds are the most effective in producing more angular speed, according to the Bessler principle. Attempts at equalizing the rotational kinetic energies and angular momenta of the nuclei would remove the largest angular speeds, which removal greatly curtails the most energy productive portions. Consistently producing *rotational energy* by means of injected large angular speed working "capital" is neither a depleting gamble nor a zero sum energy game, unless perhaps some of the capital is nearly zero-energy-sum wasted on idle wealth of large-angular-speeds of nuclei, internally-rotating around vertical axes.

Don't Equalize Angular Speeds. Taking from the rich and giving to the poor may be popular in the story of Robin Hood but it is exactly the wrong thing to do, if

one wants to greatly increase the production of *rotational kinetic energy* in a Papp engine. One might also consider the Parable of the Talents in Matthew 25:14-30.

Avoid Angular Speed Extremes. The other extreme of too much power being generated can lead to dangerous-out-of-control situations. There must be a practical-workable situation striking a proper balance between large power production and over-confined safety. Papp made it work at least until he in anger changed to a new setting that might favor greater power production or blowing up his engine to demonstrate the power of his device, when the cord was plugged back in, which Feynman had unplugged without permission and had kept unplugged without permission. Prior to the explosion Papp apparently turned up power on his Variac® transformer (producing more energetic high frequency sparks, with its power coming from the machine). The interference may have been the shutting off power to some stabilizing horizontal magnetic fields (since the Papp engine only ran rough and never stopped, when the cord was unplugged), which fields might have been used to extract more power from the Bessler principle and preferentially create nuclei rotating more productively about horizontal axes instead of about other axes. A fully-proper demonstration would have powered magnetic fields from the power produced by the Papp engine and not used any external power source to power any stabilizing magnetic fields. Feynman was convinced that he was unplugging a power source for a hidden battery for this so-called perpetual-motion-machine and all he needed to do was to wait for the battery to be depleted, which would stop the device. Feynman was wrong, since the device never did stop but only kept running rough. Papp, after a warning for people to back up, plugged the cord back in and then the machine blew up, without any trace of chemical explosives being present, according to a later investigation.

Proton Are Most Rotationally Stable Nuclei. It is quite interesting how the hydrogen nuclei or protons can somehow handle the great internal angular speeds without destroying themselves. Again, the proton is the most rotationally stable nucleus. The greatly unconstrained angular-speed-rich protons in the Papp engine can provide much energy in great abundance, by the Bessler principle.

Larger Nuclei Can Provide More Power. The larger nuclei can provide even more power by their rotations since they are more massive.

Helium Nucleus Can Handle Much Angular Speed. The helium nuclei within large bounds can handle much angular speed without being rotationally ripped apart. One might think of a rapidly-rotating deformed nucleus of helium (pnnp in nearly a line segment rotating about a horizontal axis) can decay down to a normal helium nucleus. As it does this it would produce photons by interaction during the process. The interaction can be with electrons or photons during the decay of each rapidly rotating nuclear ground state. I think that interactions with electrons are much more likely. An electron struck by a rapidly moving proton (within a rapidly-rotating nucleus of helium) can produce a photon. The electron would have been attracted to the positively-charged proton before it is struck with great vigor.

Other Noble Nuclei Can Handle Great Angular Speed. Other noble gases can also handle or tolerate great amounts of internal angular speed of their nuclei while contributing to energy production, through the Bessler principle. The great internal angular speeds can occur without the nuclei rotationally destroying themselves, as long as the rotational angular speeds are not too great.

Kinetic Energy Production Rationale. I don't want to imply that only the particles with the largest angular speed (each internally rotating about their own horizontal axis) contribute to energy production in the Papp engine. Even the particles with the smallest (or rotationally poorest) angular speed (internally somewhat rotating about their own internal horizontal axis) contribute somewhat to energy production by the Bessler principle. It is just that the largest angular speeds dominate the energy production. I explained those comments, on p. 171 of ***GWU***, in paragraph "**Internal Kinetic Energy Production Approximate Calculations**", using a little algebra, which I will not repeat here.

Use of Magnetic Fields in Papp Engines

Questions of External Current Source for Papp Demonstration. Two questions come up. Why did Joseph Papp use an external source of electrical current during his 18 November 1968 Papp engine demonstration? Using such would be a pretty strange thing to do during a demonstration of a perpetual motion machine. Also, when Richard Feynman boldly unplugged the external electric current and tried to hide the problem of it being unplugged or he tried to prevent it from being plugged back in, why did the engine merely run rough and it never actually stopped running, as it should have stopped when any supposed hidden battery ran out of power? It might be fair to supply such an external current, if its only purpose were to provide external "static" magnetic fields, which in principle could be supplied perpetually using one or more permanent magnets. With that in mind, I think that both questions can be answered nearly together in the following and the next paragraph. I think that the Papp engine would run much more efficiently, if horizontal magnetic fields were supplied to the gases in the spark chamber. The rotating nuclei would change their rotational axes so that they would align themselves, according to the local horizontal magnetic fields so that they would be rotating about horizontal axes, which would mean that they would acquire more power from the Bessler principle. I think that he didn't have a full demonstration including supplying the horizontal magnetic fields using power produced by his engine.

When the externally-provided horizontal magnetic fields were removed, the engine would still run though not quite as efficiently. There would still have been some nuclei rotating about horizontal axes, though not as many of them. Nuclei rotating about other axes would still acquire extra rotational kinetic energy by the Bessler principle from gravitons coming from various portions of the earth. For example, vertically moving gravitons would still supply some extra rotational kinetic energy to nuclei rotating about axes other than horizontal, as long as the rotational axes were not vertical. In retrospect, it was most unwise for Feynman to suggest that the invention of a powerful engine is a hoax, unless he wanted to anger

the inventor and cause Papp to turn his powerful invention into its own powerful explosive destruction. Feynman was very sure of himself and couldn't see/think outside his constraining box of conservation of energy.

Horizontal Magnetic Field Coils to Partly Replace Warming Coils. Building orthogonal sets of large coils for producing horizontal magnetic fields could somewhat replace the warming coils used to heat the Papp engines. Instead of electrical energy being wasted for merely heating the Papp engine, the energy could be beneficially used to produce horizontal magnetic fields. While producing the magnetic fields the Papp engine could also be warmed. For aircraft, there could be a sensor for detecting vertical (along with normal sensors for detecting external magnetic fields) so that the coils could supply horizontal magnetic fields for the engine which may be at various attitudes. Current to the orthogonal sets of coils could then produce horizontal magnetic fields to the Papp engines.

Safely Increasing Power Production. Giving Papp the benefit of the doubt, Papp may have turned up power on his Variac to try to increase power production, when there was a loss of the horizontal magnetic fields supplied by external power. Nonetheless, he didn't turn back down the Variac, prior to the plug being plugged back in. There was an explosion. The horizontal magnetic fields may have caused the energy production to be much more efficient, when more power was supplied to the high frequency sparks. Papp did demonstrate the power of his engine by it being ripped apart. Unfortunately the unplanned explosion was not a safe demonstration. Modern-day use of the Papp engines will need to be equipped with proper safety protocols so as not to have an accidental repeat of such a mishap. The explosion of the Papp engine gave evidence for the Bessler principle.

Recommend Supply Horizontal Magnetic Fields. When we build modern-day Papp engines, I recommend that we supply, where possible, horizontal magnetic fields to the Papp gases in the spark chambers. When properly implemented, they should strengthen rather than weaken any naturally occurring horizontal magnetic field components, possibly provided by the earth's magnetic fields. With those horizontal magnetic fields, the rotating nuclei should rotate more purely about horizontal axes and then more energy should be acquired by the Bessler principle. If the Papp engine is producing too much power, reducing the horizontal magnetic fields is one way to reduce power besides the obvious way of supplying less power through the high frequency sparks.

Yet Another Neglected Disclosure of Horizontal Magnetic Fields. As with various other things which Papp somehow neglected to fully disclose in his patents (needing much ordinary hydrogen gas in his noble gas engines, using reflections in his spark chambers, using photon power coming from extremely rapidly rotating nuclei, using the Bessler principle for power production, needing rotational moderation to avoid dangerous conditions, having an option of single-stroke engines, timing sparks just prior to maximum piston speed going away, and timing sparks just prior to maximum piston speed coming inward for best braking or destruction of power), Papp didn't explain about needing to have horizontal magnetic fields in the spark chambers of his Papp engines. It seemed as if Papp

was half-heartedly making disclosures to keep his financial backers happy, when he really wanted to keep his Papp engines as his trade secrets. Fortunately with knowledge of the Bessler principle we can see the information that he was leaving out of his patents.

Magnetic Field Implementations for Papp Engines. Modern-day implementations of magnetic fields for the Papp engines may need knowledge of the vertical direction and the knowledge of the external magnetic fields. Based upon such information, loops of wires with current supplied to them could be used together to supply horizontal magnetic fields to the Papp gases in the spark chambers. When implemented in cars, trucks, and trains, where vertical is known approximately, maybe only two sets of loops about orthogonal horizontal axes would need to be supplied. That might even work for airplanes, if they don't do such things as rolling or making steep dives/climbs.

If we get the Papp engines to work, using my suggestions, then that should provide much evidence for the Bessler principle.

Use Papp Engines and Closed-Cycle GEET Reactors Together

It is possible that Papp engines and closed-cycle GEET reactors might be used together, since temperature problems of one can be solved by the other. Papp engines run cool and need heating. The exhaust coming from burning the gas produced by GEET reactors is too hot and needs cooling to be reused as vapor fuel. The used exhaust produced by an engine running off the GEET produced gas could be reused as more fuel in a closed-cycle GEET reactor and engine, if the exhaust gas can be sufficiently cooled using the Papp engines. The problem of one system becomes an asset for the other system. One could say that they have complementary problems so they may symbiotically be used together.

I had suggested on pp. 198-199 of ***GWU*** that Tesla turbines could be used to cool down the exhaust gases from engines using gas processed by GEET reactors so that the cooled down exhaust gas could then be used again in GEET reactors. The further use of Papp engines to cool down the exhaust gases from Tesla turbines would allow even greater cooling of the exhaust gases, if such greater cooling is needed.

10~ Explanation of McKinley Low-Friction Demonstration

The Bessler principle may be used to explain the behavior of the wheel observed at the spring 1968 McKinley low-friction-demonstration in Albuquerque, New Mexico. During the demonstration of the horizontal axle wheel, there was a slight wobble at the time that the ultra-low-friction bearing was formed. There may have been a slight effective rotation because of the wobble. Each nucleus rotating in its particular rotational direction received more angular speed in that direction, according to the Bessler principle. There was communication/transfer of angular momentum between each nucleus and the wheel itself through the surrounding atomic lattice. There was initially a competition between nuclei rotating in separate rotational directions. One direction won the competition and the wheel began to rotate more rapidly in that direction, which was counterclockwise as viewed while looking north at the wheel's south side, meaning as viewed from the

south. That rotational direction happened to be different than the slight clockwise rotating portions of the wheel (as viewed from the south), if it had been firmly attached for a long time to the earth rotating about once per day, prior to the bearing being formed. One might have guessed that there could have been a slightly greater chance of rotating clockwise as viewed from the south side because of the slight daily rotation (of once per day) existing in the earth. That clockwise rotational preference as viewed from the south may have been altered during the setup prior to the demonstration, by some slight prior rotation of the wheel counter to that rotational preference. I don't know if nuclei could retain a rotational preference (with the assistance of the Bessler principle) over a time period of at least 15 minutes. Future experiments might be able to resolve such ideas. The behavior of the wheel at the McKinley low friction demonstration gave evidence for the Bessler principle.

Normal Rotational Conventions for Earth. Here are some normal rotational conventions for the earth. The earth rotates slightly more than a full revolution (with respect to the nearly "fixed" stars) every day. The sidereal day, based on star sightings, is slightly less time than a normal solar day. As viewed by looking down on the earth from the north or from far above the North Pole, the earth rotates counterclockwise about once per day and the earth travels around the sun in a counterclockwise manner once per year. As viewed by looking down on the earth from the south or from far above the South Pole, the earth rotates clockwise about once per day and the earth travels around the sun in a clockwise manner once per year. The angular velocity of the Earth points up out of the Geographic or True North Pole.

Further Motion of McKinley Wheel. Nuclei acquired more and more angular speed about axes (parallel to the horizontal axle wheel and through the centers of the nuclei) by the Bessler principle. The angular velocities were in the opposite direction from the component of the angular velocity of the rotating earth in the direction parallel to the horizontal axle wheel. The angular speed grew until there was equilibrium between power acquired by the Bessler principle and power removed by other means, such as air friction and air thrown outward by the radial ridges.

9~ Solar Corona Explanation

Here is an explanation of how the few yet extremely-energetic-coronal-radiations are mysteriously produced at the furthest locations of the solar atmosphere, despite such locations being where there is the most exposure to the ultra-cold, 3° Kelvin background-temperature of space.

Most Rotation Where Least Rotational Interference

The Bessler principle accounts for the temperature increase, of the radiations coming from the upper atmosphere of the sun, as elevation on the sun increases and especially when in the presence of somewhat horizontal magnetic fields. The furthest atoms/ions/nuclei from the sun experience the least interactions with other such atoms/ions/nuclei. The nuclei in such locations are most free to rotate with lowest friction about somewhat horizontal axes and receive much greater angular

speeds as their angular speeds greatly increase, according to the Bessler principle because of the much gravity. Then, in many cases, a negative electron is attracted to an extremely-rapidly-rotating positively-charged nucleus so that the electron is struck by the rotating nucleus. A very energetic photon of electromagnetic radiation is then produced. The few-mysterious extremely-energetic radiations do not come out of nothing. Their much energy comes from many two-part gravitons from the sun increasingly providing torques, accelerating the angular speeds of very rapidly rotating nuclei to even greater angular speeds. The phenomenally large temperatures coming from the upper atmosphere of the sun gives much evidence for the Bessler principle.

Protons Survive Extreme Rotations

The protons (positively charged nucleons), meaning the nuclei of ordinary hydrogen atoms/ions, are the only nuclei which can survive under such conditions, without being rotationally ripped apart into individual rapidly-rotating nucleons. The process of increasingly high angular-speeds of protons might not rotationally rip apart such protons because they give off some less energetic magnetic radiation as their normal nuclear-magnetic-moments are rotated. It may serve as a safety valve, to prevent rotational self-destruction of the protons.

For more information, see my prior discussion in section "Solar Corona Explained" on pp. 85-86 of ***GWU***.

8~ Solution to Earth Temperature Puzzle

What is the solution to the earth temperature puzzle or what is the proper answer to the understood question, "Why is this earth not a frozen ice ball? For a prior discussion, see pp. 88-90 of ***GWU*** in the section "Earth not Frozen Ice Ball".

There is a persistent effective source of gentle heating which is keeping this earth from freezing. One can take a tip from the energy productive solar corona. The atmosphere and the earth are both obtaining/producing much gentle heat/radiation from the Bessler principle. We should be appreciative that there is something that can in the most exposed locations fight against the ultra-cold background of space.

Earth Surface Heating by Atmosphere Explained

The heating of the earth's surface by its atmosphere is generally a much gentler manifestation of the Bessler principle than the solar corona. The primary reason for the gentleness is that the gravity within the earth's atmosphere is typically about 28 times weaker than in the sun's atmosphere. Using available numbers from p. F-146 of ***CRC***, we get a clue about the situation from a gravitational ratio of $28 = (\text{MassOfSun}/\text{MassOfEarth})*(\text{RadiusOfEarth}/\text{RadiusOfSun})^2$. It is the ratio of the gravitational force on a particle located at the radius of sun divided by the gravitational force on the same particle located at the radius of the earth. The ratio would change as larger radii are used that are more likely to correspond to locations within a represented atmosphere. If the larger radii were the same multiples of the main radii, then the ratio would remain as 28, which suggests gentler radiation on the earth. Other things can influence the strength of the radiation from the Bessler

principle, such as local density of the atmosphere and attitude of prevailing magnetic fields.

Energetic radiation can occur above the earth in the very weakest parts of the earth's "atmosphere". There stationary-yet-rotating charged-particles (such as protons) can internally rotate more rapidly because of the Bessler principle. They would become magnetic dipoles and would tend to align with, to help change, prevailing magnetic fields, within the radiation belts. Moving trapped particles within belts might also contribute to the belts. I think that might more fully account for the Van Allen radiation belt(s) or details that are typically not mentioned in their usual explanation. Protons rapidly rotating can provide a small amount of energetic radiation, as electrons are attracted to them, struck by them, and sent forth from them.

Electrons interacting with the rotating nuclei in our atmosphere (at all elevations) cause photons to carry away some of the energy acquired by those energetically rotating nuclei, which rotations are due to the Bessler principle. The photons generally have larger frequencies at the higher elevations. This and other sorts of friction prevent the rotating nuclei in our atmosphere from rotating too rapidly, especially at lower elevations where there is greater interference because of greater density of the atmosphere. There is gentle heat and other frequencies radiated from above us and near us in our atmosphere, which energy keeps our earth and atmosphere from freezing. With our atmosphere being maintained by it not freezing, this also allows any additional "greenhouse effect" to be effective. I suspect that nearly all of the extra observed radiation from the sky actually comes from the Bessler principle effect rather than from the so-called greenhouse effect. Separating out the two effects is a little tricky. Many people incorrectly assumed that energy was always conserved so any extra heating in a greenhouse had to come from conversion of input energy by an energy conservative greenhouse effect. Though energy is converted, I think that is not the full story. A more complete story is especially needed at higher altitudes where there are fewer disruption so that nuclei can rotate more rapidly about horizontal axes for longer times to produce more energetic photons. Radiation from the sky includes airglow/nightglow (see pp. 95-96, 365 of ***GWU***).

Earth Interior Heated by Bessler Principle

The earth itself is slowly spinning relative to the "fixed" stars. The nuclei within the earth's interior also slowly spin and thus acquire additional *rotational kinetic energy* from the Bessler principle. The Bessler principle provides much heating and angular momentum to the earth, though not quite as much when close to the earth's rotational axis (where gravity is nearly parallel to the rotational direction or where the rotational direction is nearly a vertical axis). This means that the solid portions near the poles, far from the center of the earth, pick up little heat and angular momentum, by the Bessler principle using the earth's gravity, relative to solid portions on the equator (where gravity is nearly perpendicular to the rotational direction or where the rotational direction is nearly a horizontal axis). Angular momentum of a tiny mass is the mass' radial distance (from the axis of

rotation) times the perpendicular portion of linear momentum (perpendicular to both the radial and the axis of rotation). Linear momentum is mass times velocity of the mass. The earth does not spin with larger angular speed mainly since there are tidal forces that sap away energy and angular momentum. The earth is not spinning as rapidly with time, but without the Bessler principle it would be spinning much more slowly. Decaying radioactive nuclei do provide some slight heating to the earth but a more complete picture of the heating source must include the dominant heating from the Bessler principle.

Principle Provides Dominant Heating Source

According to the Bessler principle, gravitons from both the earth and the sun (in smaller part) can cause many spinning nuclei within the earth and in the earth's atmosphere to spin more rapidly, which can add to the spin of the earth. The extra spin of the earth is lost to tidal friction. Friction can be associated with radiation/heat. Some radiation can later be converted to heat. I think that the Bessler principle provides the dominant heating source for the earth, including the earth's interior.

Global Cooling and Warming. With the earth spinning less rapidly in time, the Bessler principle heating source within the earth will contribute less heating to the earth's interior. That could contribute to a slight global cooling of the earth itself, which could be a tiny problem in opposition to the problem of global warming. Many people are mistakenly concerned with global warming supposedly due to the greenhouse effect. I think that the largest part of what has been called the greenhouse effect is actually due to a Bessler principle effect in our atmosphere. I think that we just didn't previously understand our prior observations. Nuclei rotating about horizontal axes can induce atmospheric molecules to rotate about horizontal axes causing other nuclei within the molecules to rotate about parallel horizontal axes. The rotations are internally more coordinated in larger molecules and atoms. We wisely should not be dumping large quantities of pollutants into our atmosphere. We should be good stewards of our resources and our environment. The Bessler principle could provide us with many non-polluting sources of energy, often at economically advantageous costs. This should greatly reduce the amount of carbon dioxide produced, as in the future (after some Bessler principle sources of energy are found to be very inexpensive) there would be much less dependence on medieval burning of fuels to produce energy. Encouraging the growth of more plant life on the earth and in the oceans should also absorb more carbon dioxide from the atmosphere. The carbon dioxide in our atmosphere encourages more plant life.

Carbon Dioxide and Water Are Good. We should no more declare war on carbon dioxide in our atmosphere than we should declare war on water in our atmosphere. Both are good or beneficial to plant growth though both create heating in our atmosphere because of the Bessler principle. We should not worry about having too much of them in our atmosphere, since having more of them can create interference or rotational moderation. That can cause not as much rotations about horizontal axes, not as much heating, and in essence relative cooling.

Climate Models Require Bessler Principle. I think that any climate model of the earth is quite lacking, if it doesn't even include the dominant heating effect for the earth, namely the Bessler principle. Without a climate model including the Bessler principle, we might expect its predictions to have little validity unless it incorporates pertinent measured data to partly cover for it not including the Bessler principle. The earth not being frozen gives further evidence for the Bessler principle.

7~ Explanation for Satellites Tumbling

Out of Control Tumbling Explanation. Satellites can tumble out of control because of the Bessler principle. That is the short answer/explanation. See pp. 138-139 ***GWU***. I think that the scientists and engineers studying torques on satellites didn't understand how a very tiny bit of tumbling could cause an extra torque that could cause an even greater torque and repeatedly much more tumbling. They had been extensively studying the issue but their training and energy-conservative mindset apparently wouldn't allow them to consider the correct Bessler principle solution to their problems. Even with the knowledge of the Bessler principle, various studies have application in that, if a satellite can have initial tumbling suppressed, then problems due to the Bessler principle can initially be suppressed. Essentially no rotation causes there to be essentially no further rotation, according to the Bessler principle.

Geosynchronous Satellites Rotate

It should be noted that even if a geosynchronous satellite has a geostationary orbit and has a "stationary" position with unchanging angles relative to the earth, it still rotates slightly more than once per day, since the earth (with respect to the nearly "fixed" stars) rotates slightly more than one revolution every day. A geosynchronous satellite that is fixed relative to the rotating earth is not rotationally stationary, so it is affected by the Bessler principle.

Bessler Principle Source of Satellite Instabilities

Given the Bessler principle and especially further away from the atmosphere of the earth, there should be other strange types of tumbling that might be poorly explained by anything else such as some sort of atmosphere dragging. Such other types of tumbling might provide evidence for the Bessler principle.

I think that people need to consider the inherent instabilities associated with the Bessler principle, if they really want to understand why satellites tumble out of control.

Satellite Tumbling Questions. One can directly ask the question, "Why do satellites tumble?" Another related question should also be asked, "Does the tumbling increase and if so under what conditions does it increase?" One could also ask the specific question, "Would satellites tend to especially increase in their tumbling, if their motions were within the plane formed by the centers of the earth-sun-moon and if the axis of satellite rotation (relative to the "fixed" stars) were perpendicular to that earth-sun-moon plane?" In such a system, a satellite could rotate about an axis that is simultaneously horizontal with respect to all three bodies.

Study of tumbling of satellites would not be effective, if the satellite were somehow equipped with some means to remove such tumbling. To avoid such tumbling correction concerns in a study, it might be easier to create a satellite without any corrective means for removing tumbling. Observing a sphere or a rotationally symmetrical cylinder rotating in space might be a simple way to perform tests of the Bessler principle. A rotationally symmetrical cylinder (rotating about its axis of rotational symmetry) might be preferable to a sphere, since it would nearly minimize rotational friction, while clearly showing the axis about which the rotation is occurring.

A potential explanation due to some sort of atmospheric gradient could be removed by seeing if increases in tumbling for the same location are just as effective for one angular velocity as for the reverse angular velocity relative to the "fixed" stars. The zero for the angular velocity would be no rotational motion with respect to the "fixed" stars.

Test Rotation of Cylinder in Space

One could rotate a cylinder at low friction in space about its symmetry axis. It would be best if the rotation axis were perpendicular to the plane formed by the centers of the earth, the sun, and the moon. It would be preferable for the cylinder to be located approximately in that plane. It might be preferable to do tests for cylinder rotation out in "pure" space, where there is less concern about air friction, but it might be much easier to do tests within a pressurized cabin, while floating in orbit out in space. If the cylinder is observed within a pressurized cabin out in space, then the experimenters should guard against air currents being the source of angular speed increase. One way of doing that would be to float the object inside of a clear object to block off external currents. The clear object would need to be large enough so that it doesn't come into contact with the cylinder. Marks could be placed on the cylinder to assist in the measuring of its rotational speed. The marks would need to be visible on videos taken of any cylinders. If the angular speed of the cylinder increases, relative to the "fixed" stars, then that would be a positive result in favor of the Bessler principle. If the angular speed decreases that would be a result against the Bessler principle (assuming air friction is low enough). Clear objects to block off air currents may be cumbersome given the need to provide an initial angular velocity. Maybe the air currents should just be reduced as much as possible and tiny streamers can be set out to show air currents.

Use Previously Non-rotated Cylinders. The cylinders used in experiments need to be cylinders, which were previously never rotated rapidly about horizontal axes. The reason for the restriction is a cylinder previously rotated rapidly about a horizontal axis can cause its nuclei to rotate even more rapidly about horizontal axes, which could cause them and the cylinder to be hot, which would permanently destroy some of the lattice connections between the nuclei and the cylinder. Such destruction might reduce the future capability of the cylinder rotating about a horizontal axis to cause the nuclei within to rotate as rapidly. Such destruction might also reduce the future capability of any rotating nuclei within the cylinder to cause the surrounding cylinder to rotate as rapidly about a horizontal axis. The

opportunities for observations of cylinders/satellites tumbling should not be depressed. The increased tumbling of satellites/cylinder would give much further evidence for the Bessler principle.

Frame of Non-rotation. Just in case it wasn't previously clear, we should emphasize the best frame for measuring the angular velocities. The angular velocities should best be measured with respect to the "fixed" stars or better yet with respect to the rotationally "fixed" galaxies.

6~ Explanation for Sun Energy

So as not to create more anomalies or mysteries, the sun should be simply considered as not getting its energy primarily from inherently unstable hot fusion. The sun is getting its radiant energy from another much more-stable source. It almost seems as if the sun is getting its radiant energy out of nothing, but there is an actual source for the sun's radiant energy. Though seemingly a magical sort of process, it is not hocus-pocus magic, if one understands the actual energy source. It might be considered a miraculous process, but is a miracle less miraculous, if one understands how it is done? It does require a different sort of thinking. Let us consider the actual single-explanation energy source of the sun. We need to consider an explanation based upon the Bessler principle.

Sun's Radiant Energy from Bessler Principle in Photosphere

The short explanation, for the sun energy puzzle, is that the photosphere gets its primary source of radiant energy from the Bessler principle. Nuclei rotating about somewhat horizontal axes increase in their rotations about horizontal axes, thus increasing in angular speed and *rotational kinetic energy* by the Bessler principle. Negatively charged electrons are attracted to the rapidly-rotating positive nuclei and then the electrons are struck by the rotating nuclei, thus creating energetic photons and electrons. The energetic photons and electrons create plasmas. When atoms and ions are struck by photons and electrons, they tend to increase in their translational speed. When electrons are knocked off atoms, the atoms become ions. Rotating positive-nuclei create tiny magnets within atoms/ions. The tiny magnets in the plasma interfere with each other as their large translational speed causes them to rapidly go by other such nuclei. The encounters allow nuclei to magnetically interfere with each other. The magnetic interference causes many horizontal magnets to no longer be horizontal. This interference thus prevents many nuclei from rotating about horizontal axes, which prevents many nuclei from rotating rapidly about horizontal axes. The much interference prevents many nuclei from acquiring large amounts of energy by the Bessler principle. The photosphere is limited to about 6000° Kelvin. For my longer prior discussion and explanation, see pp. 81-84 of ***GWU*** (section 4.4 Sun Power) to see how the sun gets its power.

Though the Bessler principle has some unstable characteristics, in terms of overall power production for an object the size of the sun, the sun as powered by the Bessler principle should be considered as quite stable. Locally there is much energetic production of power but over the photosphere it averages out to stable production of power, with neither there being any possibility of it blowing up nor

stopping in its power production. If the planet Jupiter (or the planet Saturn) were to gradually increase in mass to the size of the sun, then the planet would gradually increase in excess power production, until it attains the power production of a star. There is no danger of a star powered by the Bessler principle running out of fuel, since its fuel is its never ending supply of gravity, which it would never run out of. Even with a tiny bit of fusion of nuclei within the star slowly changing the contents of the star, the Bessler principle could rotationally rip apart heavier nuclei on its edges into hydrogen atoms.

I think that the Bessler principle is the dominant heating source not only for our sun but also for our entire solar system. The sun is a gigantic perpetual motion device continually producing vast amounts of energy and power from a portion of its immense permanent fuel source of two-part gravitons.

Little Power Production within Sunspots

There is almost no production of power (relative to the photosphere) within somewhat-deeper dark sunspots by the Bessler principle, since the sunspots have strong vertical magnetic fields which only allow the nuclei to rotate about vertical axes. The strong vertical magnetic fields prohibit nuclei from rotating about horizontal axes and thus nearly prohibit them from acquiring energy by the Bessler principle. Thus, the somewhat deeper-down sunspots are cooler and darker than the photosphere because very little relative power is produced there by the Bessler principle. The sunspots are windows or holes through the sun's atmosphere, showing the cooler matter that is below. It is not just some sort of great coincidence that there are always cooler and darker material associated with the deeper sunspots. It is a requirement based upon the near denial of power production there by the Bessler principle. The lack of power production in the sunspots gives much further evidence for the Bessler principle.

Properly Resolves Riddle of Missing Solar Neutrinos

If the sun does not primarily receive its energy from hot fusion reactions, then this also automatically solves any riddle of missing solar neutrinos, which many neutrinos would be expected from any hot fusion reactions in the sun. Vast amounts of solar neutrinos can't be produced from hot fusion reactions, if the hot fusion reactions are not typically occurring in the first place. The riddle of missing solar neutrinos could have been counted as another enigma solved. A few solar neutrinos can be produced within the sun when there are some infrequent nuclear fusion reactions within the sun.

5~ Explanation for Coral Castle

I consider that only one explanation makes perfect sense with respect to how Edward Leedskalnin constructed Coral Castle (having 1,100 tons of coral rock) all by himself. He built it by harnessing power from the Bessler principle and specifically by using a special device which he referred to as "Ed's Sweet Sixteen". His device was mainly composed of limestone cylinders on axles, bearings from vehicles, and magnets. He kept his device under a frame ostensibly used in public for hauling heavy items on top of the frame. He described and explained operation of his device in his 1936 book, ***A Book in Every Home*** (***BEH***). I provided a

translation/decoding of ***BEH*** in my 2019 book, ***A Book in Every Home Decoded*** (***BEHD***) (which one may download at https://gravityunveiled.home.blog/ to obtain a free pdf) and also in "Appendix D Ed.L.'s Little Book" of my ***GWU***. I call Ed's device the Sweet Sixteen family of cylinders to help explain it. He showed a front view of his device within a tiny portion of the front cover of his book, ***BEH***, which front view of his device may be seen in the bottom portion of Fig. 8 or equivalently in Fig. 103 on p. 686 of ***GWU*** or equivalently in Fig. 9 on p. 70 of ***BEHD***. The Fig. 8 also shows ED.L. on top of his frame, which is the path to the pyramids for his power production by his Sweet Sixteen. Drawings of the Sweet Sixteen device from various orthogonal views may be seen in Figs. 9, 10, and 11 below for respectively the front, side, and top views. Those views are the same as Figs. 90, 89, and 91 on pp. 618, 599, and 619 of ***GWU***, which views are also the same as Figs. 4, 3, and 5 on pp. 49, 30, and 49 of ***BEHD***. Notice the similarity of the bottom portion of Fig. 8 with the drawing in the front view in Fig. 9. See a portion of that Fig. 9 on the front cover of this ***MSEHNS***. Ed was trying to show nearly a front view drawing of his device. The Figs. 10 and 11 respectively show drawings of the side and top views of the Sweet Sixteen family of cylinders.

Fig. 8. Ed's front view of his Sweet Sixteen family of cylinders.

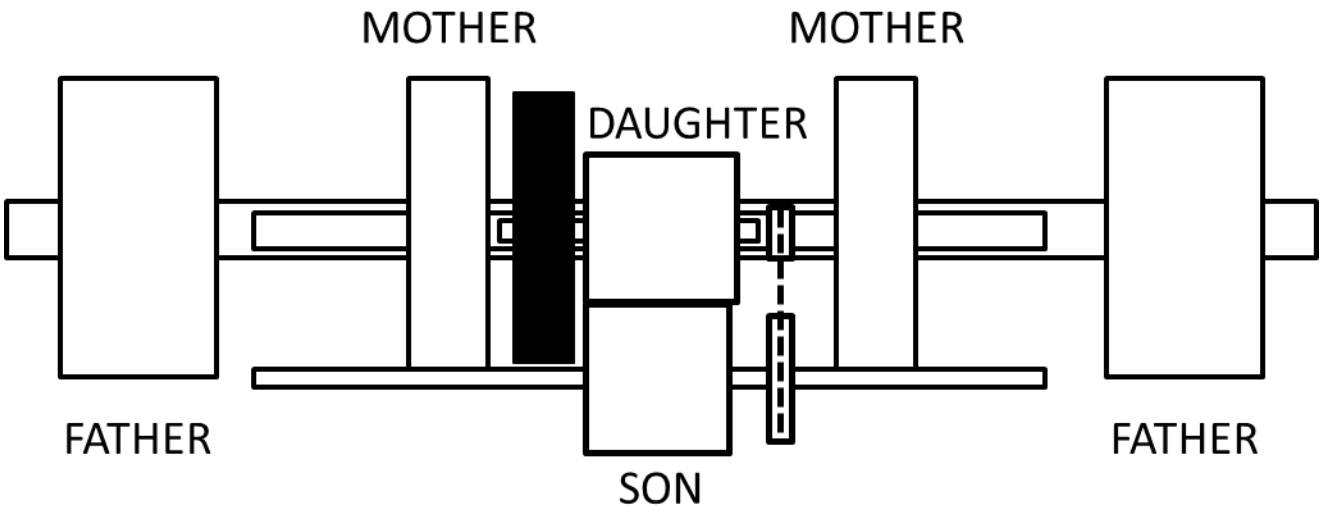


Fig. 9. A front view of ED.L.'s Sweet Sixteen family of cylinders.

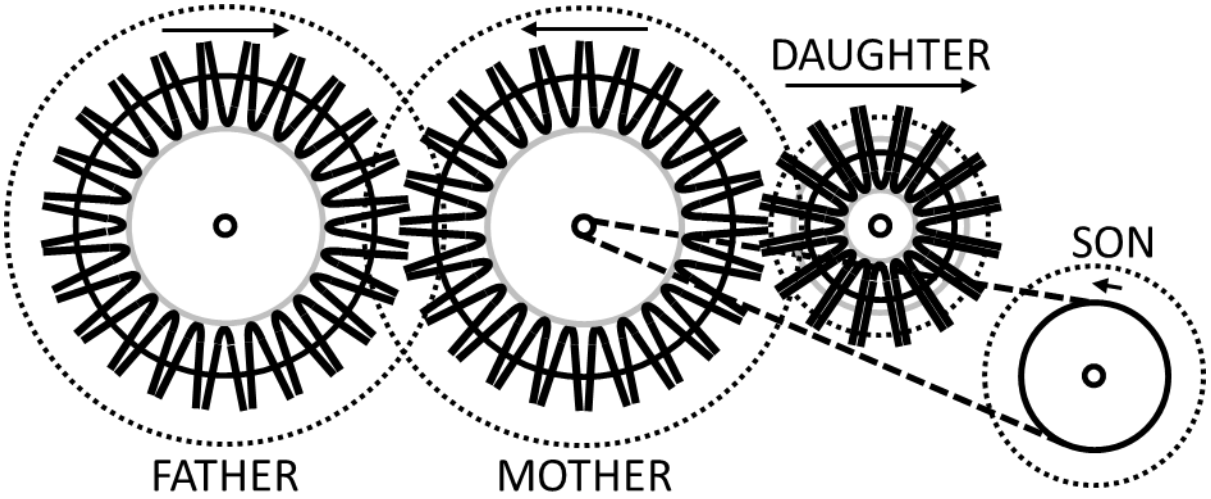


Fig. 10. Sprocket wheels for a side view of ED.L.'s Sweet Sixteen family of cylinders.

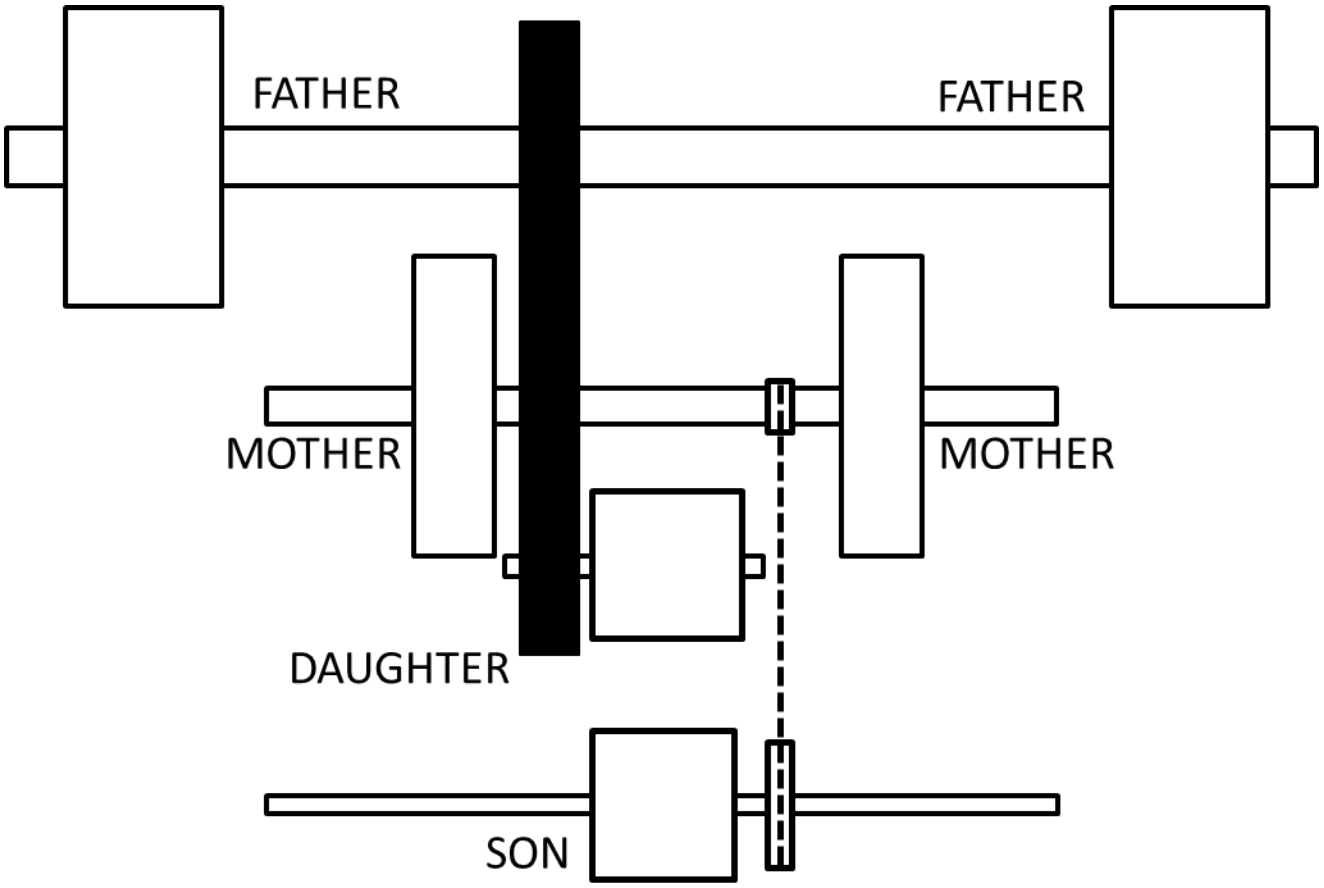


Fig. 11. A top view of ED.L.'s Sweet Sixteen family of cylinders.

Ultra-low-friction Sprocket-wheel Connections

The side view in Fig. 10 is partly shown (sans the cylinders shown by short dashed lines in the Fig. 10) on the front cover of this book, ***MSEHNS***, on the front cover of ***GWU***, and on the front cover of ***BEHD***. It is intended to show the ultra-low friction interconnections between the primary three cylinders, using sprocket wheels with magnetically-repulsive sprocket teeth. Leedskalnin showed a photograph on p. 27 of ***BEH*** of apparently the "mother" or middle sprocket wheel. The mother and father sprocket wheels each have 24 teeth. The daughter sprocket wheel has 16 teeth. I think that those 16 teeth gave Ed's Sweet Sixteen the number in its name.

Rotationally Sweet

The "Sweet" in the name is because the most rapidly rotating cylinder, the daughter cylinder, is kept rotationally new or sweet by never rotating it too rapidly. Overly-rapid rotations of nuclei would be too hot in rotational temperature and would "burnout" or destroy the surrounding lattice rotational connections between the nuclei and the wheel/cylinder. I didn't understand this idea of rotational sweetness, until I learned of it while I was translating/decoding Ed's ***BEH***.

Power Produced in Daughter Cylinder. The daughter cylinder by its most rapid controlled rotation generates much more power by the Bessler/ED.L. principle per unit mass. Of the three main cylinders, the daughter cylinder by its small size has the least air friction for a given angular speed. Ed in essence claimed that there exists a large enough angular speed for a rotationally-sweet daughter cylinder such that it generates enough excess rotational power by the Bessler/ED.L. principle (after removal of some power by the air friction and bearing friction) for the excess power to be transferred to the larger cylinders (father and mother) for storage and then distribution from the mother cylinder to the son cylinder. The power is efficiently transferred to the larger cylinders, which rotate less rapidly than the daughter cylinder, using the ultra-low-friction magnetically-repulsive-sprocket-teeth interconnections. This process is done, without the angular speed being so large that the rotational sweetness of the daughter cylinders is reduced or destroyed. There is a fine "balancing-act" which is why Ed gives various operating instructions or rules or procedures. See my translation/decoding of ***BEH***, which I provide within Appendix D of ***GWU*** or within my smaller book, ***BEHD***.

Heuristics for Transition for Power Production. One of the most important heuristics for production of power from the Sweet Sixteen family of cylinders is the transition from power input (from the son cylinder) to power extraction (delivered to the son cylinder). The magnetically repulsive sprocket wheels need to be interconnected tight enough so that there is no jerking during the transition. There must be a slow approach to the transition. There needs to be a slow gentle transition, from a gentle "smile" of the top chain connecting the mother and the son, to a gentle "smile" of the lower chain connecting the mother and the son. There needs to be gentle smiling at all times. See Fig. 10, with counterclockwise rotations of the mother cylinder and of the son cylinder. See pp. 610-614 of ***GWU***. There needs to be a gentle transition from the operator supplying power to Ed's Sweet Sixteen to Ed's Sweet Sixteen supplying sustained external power. The gentle smiling at all times should extend to power production and use.

Many Symbols

Leedskalnin's book (***BEH***) and his Rock Gate Park were both filled with symbols regarding his device. Though I likely have not found all his hidden symbols, I did find many of his symbols. While I think that the term, "ED.L.", referred to his device (pp. 243 and 700 of ***GWU***), I think that the term, "ED.L.", especially referred to the Bessler principle or Energy from Delayed Leveraging by gravity (pp. 243 and 275 of ***GWU***). I think that the term, "Ed's", also served as another compact reminder of his device. It represented a largest father cylinder (E), a medium-size mother cylinder (d), an offshoot small son cylinder ('), and a small daughter cylinder (s). The decoding key for decoding/translating of ***BEH*** was the Bessler principle itself or ED.L. or the ED.L. principle. I think that his use of the principle also includes the idea of maintaining rotationally new materials by not overly-rapidly-rotating them. The term ED.L. also represented his device: a largest father cylinder (E), a medium-size mother cylinder (D), a chain-connected small son cylinder (.), a small daughter cylinder (L), and the tiny graviton power source (.).

The letters in caps were the three cylinders which were rotationally connected with ultra-low friction.

Use Sweet Sixteen Family of Cylinders

I recommend that people use the Sweet Sixteen family of cylinders for cases where the device receives support from the ground (since the device tends to be quite massive) and the device has little turning about vertical axes (to avoid undesirable torques caused by rapid turning of the device). I think that gentle curves on railroads might not cause problems with respect to turning too rapidly as the train engine goes around the curves but rail-connection vibrations could cause problems. Using the Sweet Sixteen family of cylinders as the primary power source for railroad vehicles of all types would cause those vehicles to have nearly unlimited number of vehicle miles per gallon of fuel. Fuel might be used to start the engines, if batteries are not used for starting and if hand cranking is not used to start them. Fuel might be used in such railroad vehicles in cases of unexpected failures. I think that the Sweet Sixteen family of cylinders could be used for emergency or backup or off-grid sources. The Sweet Sixteen family of cylinders would be able to replace the coal-fired, gas-fired, and nuclear fission power plants. The performance of the Sweet Sixteen family of cylinders would give much further evidence for the Bessler principle.

4~ Explanation for Ranque-Hilsch Tube-Temperatures

Overview of Temperature Differences from Ranque-Hilsch Tubes. Temperature differences from ends of Ranque-Hilsch tubes are due to the Bessler principle which also explains the variation of the temperature differences according to changes in tube attitude. For my prior discussion, see pp. 97-100 of ***GWU***. There should also be slight variations of temperature differences due to locations of the sun and the moon. There should also be variations of temperature differences due to surrounding magnetic fields.

Temperature Difference with Attitude. A fairly well-controlled test of turbulence would be to test for the attitude dependence of temperature difference coming from the ends of Ranque tubes. See https://www.academia.edu/1646175/The_Ranque_Hilsch_Vortex_Tube or more easily see http://www.fem.unicamp.br/~phoenics/EM974/PROJETOS/Temas%20Projetos/VORTEX%20TUBE%20COOLING/cfd%20vortex%20tube%202.pdf "The Ranque-Hilsch Vortex Tube" by Giorgio De Vera, May 10, 2010, for example illustrations of Ranque-Hilsch tubes. See http://en.wikipedia.org/wiki/Vortex_tube for more references. See the example Ranque-Hilsch tube in Fig. 12 below with a horizontal tube attitude, which is the same figure as Fig. 30 on p. 98 of ***GWU*** or is similar to the tube on the front cover of this book, ***MSEHNS***. It is a counter-flow vortex-tube type. The counter-flow vortex tubes have the cold and hot outlets on opposite ends of the tube. There is at least one tangential air inlet to the tube. There is a small circular cold air outlet in the center of the tube. The hot air outlet is at the outer edges of the tube, far from the air inlet. On the hot air outlet end, I showed a blunt end on the cone valve, which I thought would help prevent some cooler air going out

the hot air end. I don't know if I showed the correct amount of bluntness to work best. For the counter-flow type, De Vera's illustrations did not show a blunt end on the cone valve. Prior theory, without the Bessler principle, seemed to have difficulty in explaining the large temperature differences coming out of Ranque tubes. I don't think that any prior theory could account for variation of temperature differences with attitude. With the Bessler principle, I think the temperature differences and their variations with attitude are relatively simple things to explain. Basically more energy can be acquired from a nucleus rapidly rotating about the horizontal axis through its center of mass than for the vertical axis situation, where a nucleus typically rotates about a vertical axis through its center of mass. When a nucleus is rotating about a vertical axis through its center of mass, it does not acquire the extra *rotational kinetic energy* by the Bessler principle that it would when rotating about a horizontal axis. I will provide some analysis of a simple horizontal tube case.

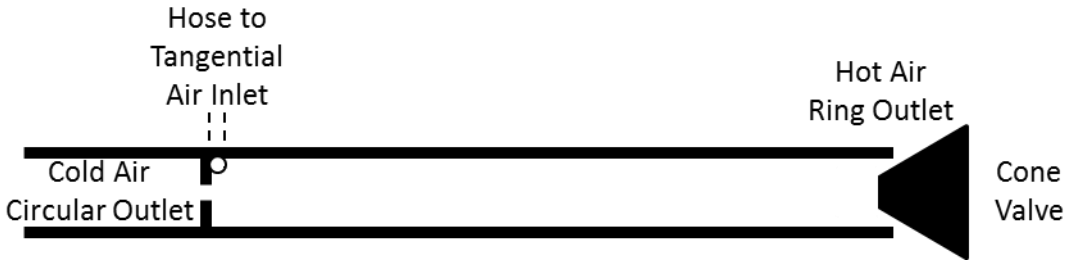


Fig. 12. Example Ranque-Hilsch tube.

Simple Analysis

For the case of a horizontal tube as in Fig. 12, input molecules/atoms near the interior surface of the tube are caused to rotate about horizontal axes as they roll on or bounce off that interior cylindrical surface. As the molecules rotate, the atoms also rotate. By overlap of the electrons of the atoms with their nuclei within, that causes the nuclei within those atoms to rotate about horizontal axes. The Bessler principle then causes each individual rotating nucleus to rotate more rapidly about the horizontal axis going through its center of mass. It acquires greater *rotational kinetic energy*, which is in part transferred back to surrounding electrons of the atoms, causing the atoms/molecules to rotate more rapidly. The roll/bounce interactions of the faster rotating molecules/atoms with the interior surface cause the molecules/atoms to move faster. Those faster moving molecules/atoms provide hot gas coming out the tube interior edges, with extra heating of the delivered hot gas occurring as the *rotational kinetic energy* of the nuclei transfer their energy to their surroundings. The discussions below are for those who want some more details about operations of the Ranque-Hilsch tube.

Higher Temperatures near Interior Surface of Tube

Near the interior surface of the horizontal attitude Ranque tube, shown in Fig. 12, the local-internal molecular/atomic/nuclear rotations and gross translational rotational-motion of gas about the center of the tube are all about horizontal axes.

Why is that? The gas molecules/atoms coming from the air inlet, at the surface of the tube, are constrained to bounce/roll along the inside surface of the horizontal attitude Ranque tube. Because of the bouncing/rolling interactions of the molecules/atoms along the inside surface of the Ranque tube, those bouncing/rolling gas molecules/atoms would internally rotate about axes parallel to the tube, with the axes going through their centers of mass. Because of overlap of electrons of the atoms with the nuclei within, the internally rotating atoms cause the nuclei within to internally rotate (about their centers of mass) in the same way as the internally rotating molecules/atoms. Those internally-rotating nuclei then acquire greater internal angular speed about horizontal axes by the Bessler principle. Then again, because of the overlap of the electrons with the nuclei, the more rapidly rotating nuclei cause their surrounding atoms to even more rapidly rotate about horizontal axes (about their centers of mass). Those more rapid rotations cause greater translational rolling, when in contact with the smooth interior surface of the tube. The greater translational-rotational and internal-rotational motions (near the tube interior surface, though their angular velocities point in opposite directions) cause there to be larger external-translational-rotational and larger local-internal-rotational motion/temperatures associated with the gases coming out from the higher temperature end of the Ranque tube. Whenever the liberated hot gas contains rotating nuclei, then the temperature will increase as *rotational kinetic energy* of the nuclei is delivered to their electrons and finally to the gas as a whole. The transfer of rotational energy within atoms to the gas as a whole is sped up by the atoms obliquely striking the surface of the cone valve, with somewhat opposing rotational interactions.

Magnetic Fields

The internally-rotating positively-charged nuclei near the interior surface of the tube create small magnetic dipoles, which may also help keep internal rotations about axes parallel to the tube, especially when the horizontal tube is in the presence of a strong-favorably-parallel horizontal-magnetic-field. Some dipoles may form rolling strings with other dipoles, though swirling motion at the edges would tend to disrupt rolling strings there. During experiments, in addition to recording Ranque tube attitude and the direction of rotational flow, it would also be best to record the angles of the tube with respect to the surrounding earth's magnetic fields, assuming those fields are not suppressed.

Colder Temperatures near Center of Tube

Because of edge interactions, the gas translational swirl may cause there to be some internal rotations of molecules/atoms/nuclei in one direction about axes parallel to the tube. With the exception of the Bessler principle, there would be less compounding of the internal rotations, when molecules/atoms/nuclei are further away from the edges. With internal rotations of molecules/atoms/nuclei in one direction about axes parallel to the tube, there may be some internal-rotational interference of molecules/atoms, when they are closer to the center of the tube. This interference may cause both the internal-rotational and translational-rotational motions (meaning swirling about the axis of the tube) to be reduced, when near the

center of the tube. The atoms/molecules with much translational motion tend to be thrown to the edges and away from the center of the tube. The atoms/molecules with little translational motion near the center of the tube could sometimes remain there at cool temperatures. If there are some remaining magnetic moments of the nuclei all in the same direction, then sometimes strings of them could have been locked magnetically in place or caused to be an even colder gas, especially when near the center of the tube, with very little translation motion of atoms/molecules relative to their neighbors. It would somewhat be a type of magnetic translational cooling. Some strings may aggregate into sheets and some sheets could aggregate together. The aggregates could break apart because of little rotations, associated by weak magnetic moments. With weak magnetic-dipole-moments or nuclear-rotations, they would not acquire much extra rotation from the Bessler principle. Thus, the translational and internal-rotational temperatures near the center of the tube should both be small. If things stray away from the center, they might be buffeted back to the center. The gas near the center of the tube should be much colder than the internal-rotationally hot and translationally hot gas near the interior tube edges. Ordinary or prior theory often only considered translations (and larger-scale internal-rotations) of fine material with respect to temperatures, without consideration of the internal rotations of the nuclei, as affected by the Bessler principle. We should not ignore such an important part of the physics.

More Tube Operation Details

Yes, the idea of rotating nuclei has previously almost always been ignored. Still, I think that the Bessler principle and the rotations of nuclei are central to understanding how the Ranque-Hilsch vortex tubes actually work. For enhanced experimental effects, one should use the more efficient counter-flow tubes (as depicted in Fig. 12 or equivalent to Fig. 30 on p. 98 of ***GWU***) in the experiments rather than the less efficient uni-flow vortex tubes (which have gas outlets on the same end of the tube).

Vertical Attitude Tubes. If the Ranque-Hilsch tube were placed in a vertical attitude, the acquisition of energy from the Bessler principle would be greatly curtailed, though not quite as much when the sun and moon are on the horizon (or are in a direction perpendicular to the axis of the vertical Ranque tube). A vertical Ranque tube can still receive some slight power from the Bessler principle, if the tube is effectively horizontal with respect to gravitons coming from the sun, the moon, and some matter somewhat near the horizon of the earth. For the vertical Ranque tube, the higher temperature end should typically then not produce as high a rotational temperature with much loss of power received by the Bessler principle, from gravity coming from the earth and especially so when the sun and moon are well away from the horizon. This provides evidence for the Bessler principle or rather the principle being unavailable. I suspect that the "cooler" end of a vertical Ranque tube should be warmer, without as much internal rotational motion and thus without as much aligning effects due to magnetic cooling in the tube centers. Also, with less angular speed about vertical axes of the nuclei at the tube centers, then the more isolated molecules/atoms/nuclei there might acquire more angular

speed about horizontal axes by the Bessler principle. Thus, I think that the "cooler" end for the vertical tube would be closer to the ambient, which would be warmer than the cold end for the horizontal tube. The behavior of the vertical tubes would give much further evidence for the Bessler principle.

External Magnetic Fields. We should also not ignore the aligning-effects of sufficiently-strong external-magnetic-fields on tiny magnetic dipoles within the Ranque tubes either helping or hindering the temperature differential, depending on specific geometries.

Greater Temperature Differential for Long Tube. Assuming favorable external magnetic fields, a somewhat longer horizontal Ranque tube should tend to produce a greater temperature differential, compared to a shorter but otherwise equal tube under the same operating conditions. In particular during comparisons, the tubes should be the same interior diameters and be made of the same materials. This should serve as further evidence for the Bessler principle, since there would be more opportunity for the rotating nuclei to acquire greater angular speed by the Bessler principle, despite seemingly greater opportunities for stagnating-rotational-friction associated with a longer tube. The inside surfaces of the tubes should be quite smooth and without surface obstructions. The surfaces should encourage internal rotations of molecules and nuclei about tube-parallel axes, when the molecules roll/bounce on the inside surfaces of the tubes. Longer tubes may also allow a greater separation of the rotationally cooler center gases from the especially hot edge gases on the other end and allow the cooler center gases to have more opportunity to be magnetically spatially cooled. The tubes should not be so long as to create plasmas. The internal and external rotations would be especially restricted at the very center of the tube, which would suggest that the outlet cold circular opening should to be small in radius, to obtain cooler temperatures coming out from there.

More Effective Vertical Gravitons. Though a small effect, gravitons going from the sun and the moon to a vortex tube are most "vertical" relative to a horizontal tube when those bodies are located at a location perpendicular to the tube. To keep the gravitons somewhat actually vertical, any experiments might be done at noon or midnight, during a new or full moon. For better performance or having the most vertical gravitons available, one might do comparative experiments at noon, during a new moon, but not during a solar eclipse. It would be somewhat advised to avoid losing gravitons from the sun or moon by their being absorbed in a large body. The benefit of the more nearly vertical gravitons is not lost for producing higher temperatures, if the tube is horizontal and favorably aligned with horizontal external magnetic fields.

3~ Explanation for Car Efficiency

Given the connected nature of cars, as a car's speed increases, the larger speed means that there is larger angular speed (p. 67 of ***GWU***) about horizontal axes for various wheels and axles within cars. Such larger angular speed about horizontal axes causes greater *rotational kinetic energy* (p. 71 of ***GWU***) to be produced by the Bessler principle (pp. 71, 78 of ***GWU***). According to the Bessler principle, greater

angular speed causes greater angle changes between the discrete reception pairs of the two-part gravitons shown in Figs. 1, 2, and 3 (also seen in Figs. 25, 26, and 27 respectively on pp. 69, 70, and 70 of ***GWU***), which create greater torques (for example see Fig. 28 on p. 74 of ***GWU***), which produce extra *rotational kinetic energy*. That extra generated *rotational kinetic energy* is what keeps car-miles-per-gallon from decreasing according to 1/(speed squared) (p. 78 of ***GWU***).

There would be a temptation to just ignore the situation by assuming that the increase in efficiency of the vehicles is simply due to the engine somehow operating more efficiently at larger speeds. Where are the underlying theoretical reasons for such assumptions, beyond the measured results? I submit that a major underlying theoretical reason for such engine efficiencies increasing with speed (or not decrease as much when speed is increased) is because of the Bessler principle, though they may not acquire as much angular speed when the materials are not as rotationally sweet because of their previously having been rapidly rotated about horizontal axes.

Principle Compensation

There is something extra maintaining those roughly "flat" or constant miles-per-gallon regions (and even linear increasing regions of mpg with speed), despite greatly increasing frictional forces. I think that the extra something is primarily the Bessler principle associated with masses rapidly rotating about horizontal axes. Think of tires, axles, and drive trains. Designs of vehicles are in part reflected by people willing to buy such designs. Designs having greater miles-per-gallon for nearly the same price would be typically purchased more frequently. I would think that an important specification in buying a vehicle with axles is the total mass of the axles. Various wheels and axles, each rotating about horizontal axes, acquire extra *rotational kinetic energy* by the Bessler principle to partially offset the larger frictional forces that typically remove kinetic energy from cars and vehicles at larger speeds. The larger the angular speed of nuclei is especially effective in generating greater angular speed of nuclei, according to the Bessler principle. Ordinary friction somewhat hides the Bessler principle but it can't completely hide the effect. That there are people trying to drive especially rapidly on freeways is evidence that there is something like a Bessler principle at work to partially combat the vicious enemy named friction. Who could afford to drive especially rapidly and pay for the required fuel, if their vehicles could only travel a few miles on a gallon of fuel?

Paradigm Clash

I think that the lower-frequency rotational-sweetness that Edward Leedskalnin was trying hard to preserve is nowadays mostly destroyed by running the axles, engines, and vehicles, at higher rotational frequencies, prior to their being delivered to initial customers. The rotational connections are partly lost between the rotating nuclei and the surrounding atomic lattice. There is a clash of perspectives as Ed's paradigm is discarded. The customers would complain, if there were strange engine jerks at particular speeds due to partially remaining rotational sweetness. When the automotive industry was very young, I think that the customers had more rotational kinks to work out in breaking in their vehicles. Nowadays at the larger

rotational frequencies there is not as reliable and complete a transfer of wheel angular speed to the nuclei so that the nuclei don't pick up as much power from the Bessler principle and the missing greater power can't be transferred back to the wheel. Eventually the nuclei are able to pick up much angular speed of the wheel and then the nuclei pick up much power from the Bessler principle, though not as much compared to rotational sweetness being maintained. More importantly going the other way the rapidly rotating nuclei are later not able to provide the wheels with as much of their power with the non-delivered power going into wheel heating and destruction of lattice connections. Now there are slight connections at higher rotational frequencies but those connections can be weak. The modern vehicle designers, not having knowledge of the Bessler principle and the idea of rotational sweetness, have completely different perspectives than Leedskalnin.

I recommend that the car designers increase the mass of the car axles rotating about horizontal axes with as much high quality metal (likely stainless steel) as is practical, if they especially want to increase highway mpg.

I think that the car data provide much further evidence for the Bessler principle.

Let us now consider the explanation for transportation situations for extremely massive railroad axles with their fully-laterally-connected massive wheels.

2~ Explanation for Large Railroad-Efficiency

The company CSX is boosting its freight carrying efficiency by such things as piggy-backing containers and running longer trains to reduce air friction. Still, something extra is phenomenally boosting CSX's mpg so that "In 2021, CSX moved a ton of freight 533 miles on a single gallon of fuel on average." I think that something extra is the Bessler principle.

Massive Railcar Wheels

The wheels and axles for railroad cars tend to be extremely massive. They allow very large masses to rotate rapidly about horizontal axes. The wheels with axles are completely solid yet they may go around curves of railroad tracks. That is possible because of a slight rotational beveling or conical tapering of the wheels, as is illustrated by exaggeration in Fig. 13 below, which was the same as Fig. 29 on p. 79 of ***GWU*** or may be seen on the front cover of this book. With the beveled or tapered rim, the radii of the wheels, on the outer side of a curve in the railroad track, are larger. As the wheels drift (or are somewhat "thrown") to the outside of the curve, the wheel radii change so that they are able to go through a curve. While going through a curve, the outer wheels of a vehicle must cover more ground than the inner wheel, and especially so, if the curve has a smaller radius of curvature. Unlike an automobile, which allows the "disconnected" outer wheels to turn more frequently than the inner wheels, an outer wheel on a railroad car is fully connected to its inner wheel, yet as the outer railcar wheel increases in radius, its connected inner wheel decreases in radius. Since 2π*radius = circumference, this means, as the outer railcar wheel increases in circumference, its connected inner wheel decreases in circumference. Thus, as the outer railcar wheel covers more rail, its connected inner wheel covers less rail. One may see

https://en.wikipedia.org/wiki/Comparison_of_train_and_tram_tracks for more discussion.

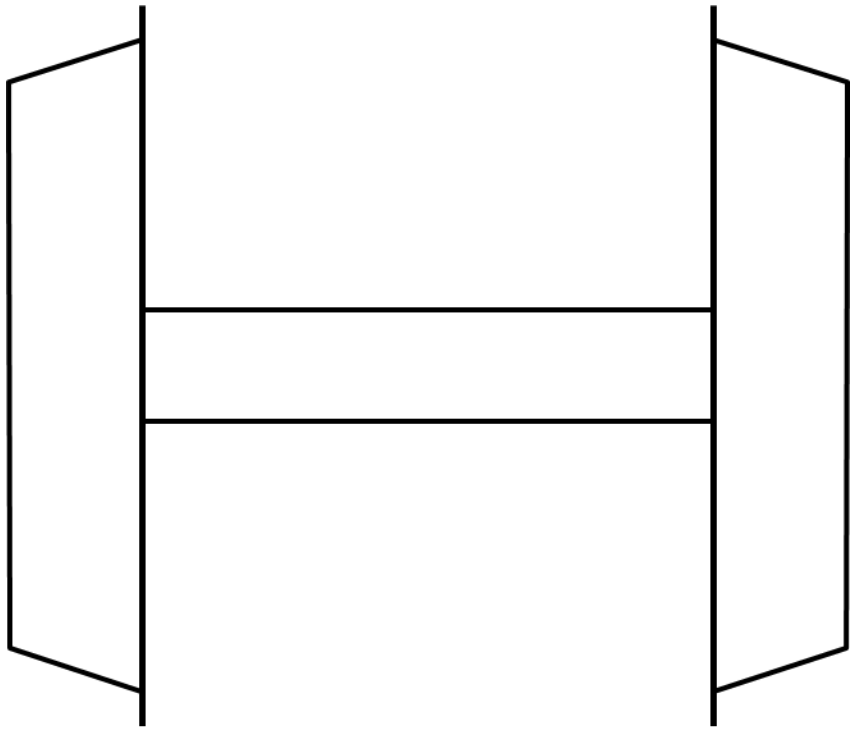


Fig. 13. Exaggerated Railroad Wheels.

There is a greatly exaggerated rotational beveling or conical tapering of railroad wheels shown in that Fig. 13 so that one can easily see the directions of the conical tapering of the railroad wheels. Because of the constant distance between the rails on a railroad track the completely solid wheels and axles can go around bends or curves of railroad tracks.

Power of Trains

Trains can be extremely fuel efficient. On the other hand these massive slithering giants seem terribly wasteful of their power, by roaring noisily, by shaking the very ground that we stand on, and by seeming to create a wind of their own. There is sometimes almost an innate respect or mysticism for trains. Could it be that people have felt a little of the great power coming from somewhere, yet somehow coming from trains? Yes, I think there is a perceived train power coming from somewhere that many people can literally feel, yet they cannot quite place the source of the power. Consider for example such train songs as "Wabash Cannonball" and "City of New Orleans". I have heard that in Japan there is at times almost awe for some older trains. The name "Orient Express" can evoke images of power, grandeur, and the unknown.

There is an explanation, for such vividly contrasting train dichotomies, available from the Bessler principle. Much power is produced in the rapidly rotating massive train wheels, yet much of its great power is wastefully lost to its

surroundings. As each wheel rotates rapidly there are many stable nuclei that internally rotate at least as rapidly as each wheel and so acquire extra *rotational kinetic energy* from the Bessler principle. One can think of each rotating nucleus as a tiny mass-concentrated ball within each atom internally rotating about a horizontal axis (through the center of the nucleus) with at least the same internal angular speed as the wheel itself rotates about a horizontal axis. Some of the acquired extra angular speed in each nucleus may be passed back to the wheel itself. Thus, trains do acquire much extra power from the Bessler principle.

Even with weak rotational connections between the rapidly rotating wheel lattices and the nuclei within, because there are so many nuclei in the massive railroad wheels, there are noticeable benefits of the Bessler principle supplying some power to the railroads.

If one asks the question, "Where does the extra energy produced by the Bessler principle go that is not passed along to the wheel as greater *rotational kinetic energy*?" I would suppose that a large amount goes to heating of the wheel. One could somewhat check that out by looking at the train wheels using say IR cameras to see if there is evidence of heating in the wheels traveling at rapid sustained speeds. I would expect to see evidence of such heating in the wheels. One could then look to see if there is an increase in heating with increases in the angular speed of the train wheels.

Railroad Freight Phenomenal Transportation Efficiencies. One can do a thought experiment so as to not actually be in danger. Pretend to go down by a rapidly moving freight train. Feel the powerful pulsing vibrations coming from it. Hear the rumbling roar with periodic clanging, as new rails are encountered. Feel the wind created especially close to it. Then think to yourself, "A gallon of fuel moves a ton of freight 533 miles." Now please don't actually do this experiment in person, so as neither to put your safety at risk nor to bombard your ears with extra non-beneficial powerful noise. You could do an actual experiment, if you did so from a very safe distance from a rapidly passing train. You can just watch the created wind blow leaves (or measure the wind speed), measure the power in the frequencies of the sound given off, and measure the power of the vibrations, possibly using a seismic recorder. Then with those measurements, try to explain to yourself how all that great power can be given off and it still is an extremely fuel efficient means to transport freight. You should notice a great disconnect. If you are reasonable with your own analyses, I imagine that you will need something like a Bessler principle to account for the large difference.

Projected Efficiencies

I have speculated in ***GWU*** on p. 134 that if either the number of wheels on trains were to double or the total mass of each wheel on trains were to double, including mass of the axles, then their mpg, for transporting a ton of freight, would at least double. The bearings would need to be comparable before and after. The angular speeds would need to be comparable before and after. The mass of the non-freight non-rotating portions of the railroad cars would need to be the same before and after. The type of the metal in the wheels would need to be the same before and

after. Until such experiments are done, we will not know what the actual results are.

If such experiments are too difficult, one might do easier experiments. If we increase the total mass of the rotating railroad wheels (including axles) by X percent, would the average number of miles per gallon for transporting a ton of freight increase by at least X percent? I would guess that would be the case. The bearings, wind resistance, train speeds, rotating metal type, and angular speeds would need to be comparable before and after. For the special case of X=100, that would be the same as the prior speculated case of either doubling the number of wheels or doubling the mass of each wheel, including axles. Even if there is only a small increase in mpg but not X percent, that would still be evidence that the Bessler principle is contributing to the large railroad efficiencies. Without the Bessler principle, we would expect no such increase (or even a decrease due to extra friction) but because there is a Bessler principle I think that we should expect at least increases in mpg by at least X percent. I think that the Bessler principle is the reason why the railroad efficiencies (in mpg for moving a ton of freight on the average) are so large.

Implementation Pragmatics for CSX. I think that CSX has made some impressive gains in mpg but they stand to make huge gains in mpg, if they do such experiments pragmatically. As a matter of implementation pragmatics, they could introduce just a few special rail cars, say about Y percent of their regularly used rail cars, with individual rail car increases in rotating mass by X percent, which would effectively reduce the total X to approximately X*Y/100 for their entire collection of trains as a whole. I would suggest that X for individual rail cars be as large as is practical. They could look to see if their total average mpg increases by X*Y/100 percent. I would suppose that they would get mpg increases by much better than that. If they do get total average mpg increases by at least X*Y/100 percent, then I would suggest that they continue to introduce rail cars, with large individual rail car values of X so as to increase their value of Y and hopefully have large increases in total average mpg of at least X*Y/100 percent.

Follow-on Experiments. I think that follow-on future experiments will provide further evidence for the helpfulness of the Bessler principle in providing such large railroad efficiencies. I would suppose that the finest quality of steel should best be used to withstand the attacks on the rotational sweetness by the very rapidly rotating nuclei within the train wheels/axles. I suspect that using the finest quality of steel in the wheels of railroads should provide better sustained rotational-lattice-connections between the wheels and the rotating nuclei within the wheels. Such providing of the finest quality of steel in the wheels should be done in later follow-on experiments. It would cost more to use better quality railroad wheels but I suspect that the extra cost will be more than paid for by fuel savings and longevity of the wheels.

Many of the experiments and tests regarding rail cars and their wheel-axles should provide much further evidence that there is a Bessler principle.

1~ Explanation for Bessler's Wheels

Karl Saw within Bessler's Wheel but Not within Bessler's Invention. The eminent Karl saw within the working wheel of Bessler but he never saw within Bessler's invention. How could both of those things be true simultaneously? The reason that both those things can be true was simply because the wheels that Bessler built were never his actual invention. Bessler's invention was not within his wheel. One must look outside Bessler's wheel to find Bessler's invention. The only thing or things outside the wheel that could possibly be his invention was or were his bearings. The actual invention of Bessler was his amazingly-wonderful extremely-low-friction roller-bearings. The ends of his wonder bearings were closed off so Karl could not look within them. Solid pieces of wood, without any distracting weights inside, would have worked just as well for Bessler's wheels. People would have been suspicious or non-distracted, if they heard no distracting weights hit. They would have looked elsewhere for a solution.

Inventing a Perpetual Turning Wheel. The first thing that one would need to invent to produce a wheel perpetually turning about a horizontal axis would be to produce bearings, which have sufficiently low rotational friction. Because of the Bessler principle, if one can produce bearings with such low rotational-friction that more rotational power is produced by the Bessler principle from the wheel turning than is removed, then the wheel will increase in angular speed until there is an equilibrium between power produced by the Bessler principle and power removed. It would be a perpetually turning wheel.

Explains Bessler's Strange Actions. The invention being his bearings explains many of Bessler's strange actions. His actions were to protect his bearings at all costs. Except for his coded book, within which he provided at least 11 coded bearing specifications, Bessler always acted to protect his real invention/secret, which secret was his bearings. He would always direct attention away from the bearings. He always made a big deal of smashing his wheels prior to moving so as to take attention away from his bearings. He let people feel a cylindrical weight from within his wheel through a handkerchief, without letting them touch its ends (pp. 79, 101, 131, and 193 of ***PM97***) so that people would concentrate on what was within his wheel and how things were arranged rather than on his bearings. Such diversions would well protect his bearings. He had his own guards to watch the other guards guarding the machine so that neither set of guards would take his roller bearings. When Professor 'sGravesande thoroughly inspected the machine by Karl's permission, without 'sGravesande looking inside the wheel. Professor 'sGravesande examined the bearings (p. 162 of ***PM97***), without Bessler being present. The next day Bessler was so upset that he destroyed the machine and wrote a poem on the door of the room in Weissenstein Castle where the perpetual motion machine had run. He said not a word against Karl; he only praised him. See pp. 118-119 of ***PM97***. I think that it was the inspection of the bearings that upset Bessler so much but he dared not say that out loud. Bessler had extracted an oath from Karl not to reveal what he had seen within the wheel (pp. 39 and 158 of ***PM97***) but the oath didn't apply to the bearings, which were the real hidden

invention. If Bessler ever had to refer to his bearings, he likely just said bearings (pp. 20, 91, 108, 131, 155, 162-163, 189, and 198-199 of ***PM97***) or he might have used the term iron bearings (p. 110 of ***PM97***). He likely allowed their outer iron surface to be rusty to de-emphasize or to attach less importance to them. But it is what was within the "iron" bearings that really counted.

You Should Understand Now. Hopefully you will now understand that all wheels rotating about horizontal axes acquire power from gravity because of the Bessler principle. The Bessler wheels were special because they had such marvelously-low friction-power-losses that, when first started, more power was initially produced by the Bessler principle than was removed by friction, sound, vibration, and work. That allowed the wheels to rapidly accelerate until the power produced by the Bessler principle was in equilibrium with power removed. When that equilibrium was reached, the Bessler wheels would rotate at a constant angular speed "perpetually".

Secret of Bessler Wheels. The secret of each of Bessler's wheels was to reduce total draining away of power, but especially in the wheel's mechanical bearings, to an amount considerably less than the amount of power being produced by the Bessler principle. That would allow the wheels to increase in angular speed as was regularly observed. The Bessler principle produces much more power as angular speed increases. Still air friction force greatly increases as angular speed increases. Air friction force more directly increases according to the square of the air speed. Air speed increases according to the product of the angular speed and the radius from the axis. The angular speed in each Bessler wheel increased, until there was equilibrium between total-useful-power-being-produced and total-power-being-removed-from-the-wheel, whether by air friction, bearing friction, sound, vibration, or work done.

All Rotating Matter Contributed. All the rotating solid matter of Bessler's wheels, including distracting weights in his wheels, contributed to power production, by means of the two-part gravitons, for fighting against friction and for work done by his wheels. For more information, consider pp. 502-503 of ***GWU***.

Wood Remained Rotationally New. The wood within Bessler's Kassel wheel remained rotationally new/sweet, since the greater air friction caused by its large 6 foot radius kept the wheel from rotating too rapidly. As long as the wheel was kept from rotating too rapidly the nuclei within didn't rotate too rapidly. That lower rotational rate kept the nuclei within Bessler's Kassel wheel from rotating so rapidly that the lattice connections with the nuclei were not destroyed and there was a good connection between the nuclei and the surrounding wheel. That meant that Bessler's Kassel wheel remained rotationally new/sweet. Similar restrictions of angular speed kept Bessler's other wheels rotationally new/sweet,

Decoding Key of Booklet Was Bessler Principle. Please note that the primary decoding key for decoding-translating of Bessler's 1716/1717 booklet was the Bessler principle itself. Solving certain of the chiasms was also of great assistance. Bessler and Leedskalnin both realized that when someone became aware of their principle, then that person would be able to decode their writings.

Though hidden until the principle was known, they knew that their secrets would eventually be known.

Bessler Got Special Help from God to Reduce Friction. Bearing friction for Bessler's wheels was greatly decreased by means of special Orffyrean roller bearings, for which Bessler provided many specifications in coded form, which required decoding. Bessler would not have been able to invent his bearings, if it were not for his great persistence and the help he received from God in the form of "a strangely invigorating dream" (p. 29 of ***PM97***). You can see my best guess for Bessler's circa 1711 "strangely invigorating dream" in "Bearing Formation Dream" (pp. 524-525 ***GWU*** or p. 68 of ***BLBD***). I think it contained the missing information, which Bessler needed prior to constructing his Orffyrean roller bearings needed for his 6 Jun 1712 Gera wheel. If you are not currently interested in the details for constructing the bearings, then you can skip them and go to the Afterword.

Orffyrean Roller Bearings Overview

Bearing Overview. For an overview of the production of the ultra-low-friction Orffyrean-roller-bearings out of initial iron cylinders, first consider the basic geometry and operation of the produced bearing in Fig. 14 below. That image may also be seen at the bottom of the back cover of this book (or see Fig. 61 on p. 262 of ***GWU***). The Fig. 14 doesn't show the thickness R of the outer containing cylinder but it was shown in Fig. 67 with labels on p. 270 of ***GWU***, where I think that the thickness R was specified by Fig. 15. With decoded labels, see some of Bessler's bearing symbolic specifications in Fig. 15 also found in Fig. 62 on p. 263 of ***GWU***, which may be compared to Table B.4 on p. 535 of ***GWU*** showing 11 bearing specifications. I am not including that table in this book, since its value is mainly as an intermediary from the symbolic bearing specifications to the formation of both the basic bearing geometry and the bearing construction procedures, both of which I am including. Then, consider the rest of this paragraph for the remainder of the overview for Orffyrean roller bearing formation. The basic idea for the bearing formation was that, rather than machining Bessler's bearings (surely an impossible task), according to his bearing formation dream, he grew lobes on surfaces of internal cylinders, while he simultaneously dug out lobe holes on the corresponding touching surfaces. An individual growing pattern of surface lobes and surface lobe-holes on an intermediate cylinder was replicated throughout one of his bearings. The grown pattern was unique to just one individual Orffyrean roller bearing. Finest-ground ferromagnetic "balls" were preferentially attracted to the magnetic outcroppings on the lobe side. After a ferromagnetic ball on the lobe side rolled upon a finest ignition-gunpowder ball on the lobe-hole side, then there was a micro-explosion encased in a metallic "micro-gun-barrel" of the surrounding metal mercury. The micro-explosion would tend to dig out further on the lobe-hole side, while building up on the lobe side. Large numbers of such micro-explosions occurred. Even if there was not a tendency to dig out further on the lobe-hole side while building up on the lobe side, there would still be a type of random walk sort of process, which would allow lobe growth while making sure that adjoining lobe-holes remain closely touching the lobes. The lobe growth continued until there was at

least a collision of a lobe with another lobe. After all the used formation mixture material was flushed out with water, then finest-steel surface lobes would often roll upon corresponding finest-steel lobe holes for rotation angles of 25° prior to surface separation. There would only be pure rolling without any slipping/rubbing of the finest-steel surfaces over their corresponding finest-steel surfaces. For normal bearings, a point on its surface would stay in contact with its touching surface for approximately 0° theoretically of relative rotation prior to surface separation. For normal bearings having lubricants and slipping/rubbing, there is an association of surfaces, by slipping/rubbing or by relative rotating of only approximately 0° prior to surface separation. There was no lubricant applied to Bessler's special bearings so as neither to increase friction from slipping/rubbing nor to squish lubricants out of place nor to create friction from lubricant surface tension/gumming. Such things make Bessler's bearing specifications highly unusual. Relative to normal bearings, Bessler's bearings were a completely different class. Bessler's bearings could carry very heavy loads with almost no friction because there was a merging of the surfaces allowing the contact support to be greatly spread out, while only having pure rolling without any slipping friction. The pattern of lobes and lobe-holes (for which there was no slipping) kept all the nine intermediate cylinders in their proper relative positions so they would never interfere with their neighbors. The bearings could even be repaired while they were being used, though such a practice would now days not generally be recommended for reasons of avoiding mercury contamination in the air/surroundings. The Orffyrean roller bearings then did not have and even now do not have practical roller bearing rivals for reduction of mechanical friction, while carrying very heavy loads. If you are not interested in more of the details of bearing formation, then you can skip to the Afterword.

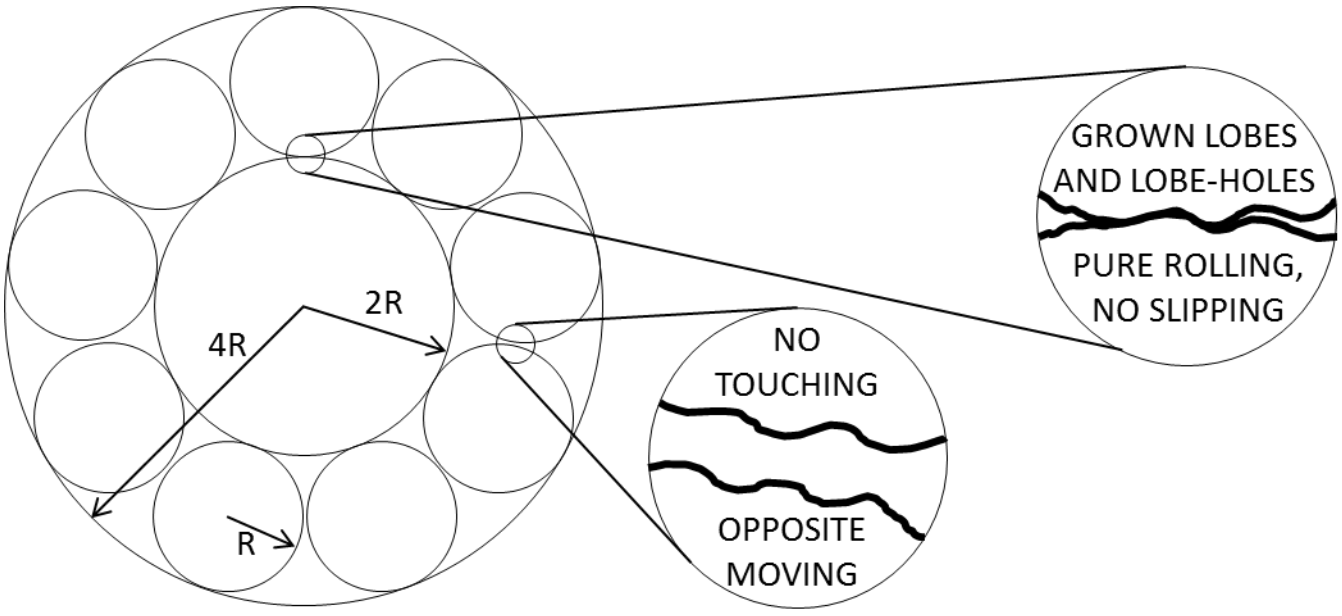


Fig. 14. Low-friction Orffyrean steel-roller-bearing.

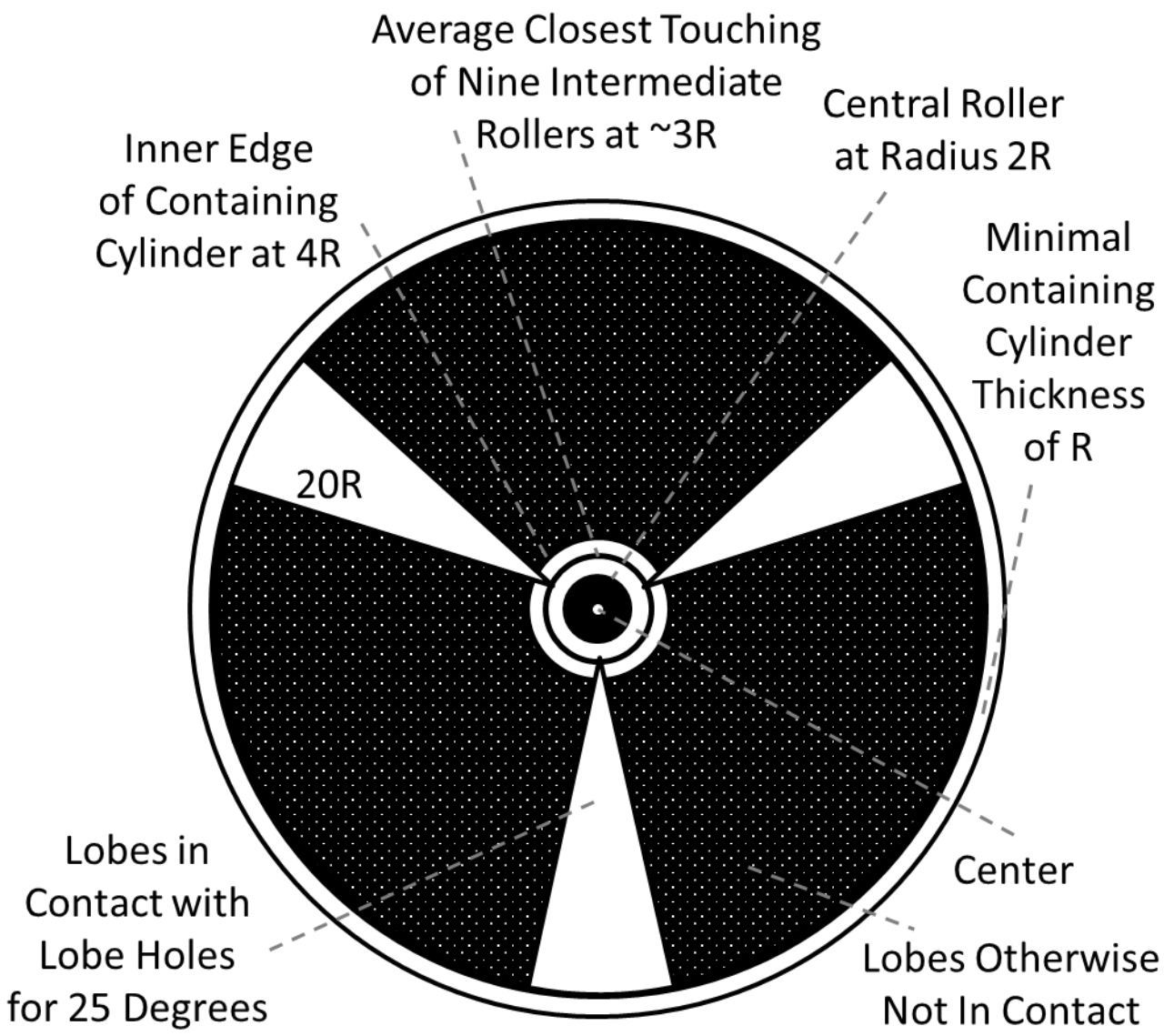


Fig. 15. Labelled version of Bessler's symbolic specification of lobe contact within his bearing.

Construction of Orffyrean Roller Bearing

Molding of Bearing Parts. Rather than by initial machining, I think that Bessler used fine molds to form the initial tiny cylindrical parts out of molten iron for his Orffyrean roller bearings. For more information see pp. 268-273 and 491-501 of ***GWU***. A single pouring of molten iron could have allowed him to make many parts concurrently. For summary details, as I now mostly replicate, see pp. 532-534 of ***GWU*** for the three long paragraphs with headings: "Initial Assembly of Orffyrean Roller Bearing", "Formation of Orffyrean Roller Bearing", and "Finishing Orffyrean Roller Bearing".

Initial Assembly of Orffyrean Roller Bearing. Bearing assembly instructions came from my interpretation and analysis of Bessler's little book,

including his final multi-viewpoint bearing-specification-figure on p. 189 of John Collins ***PM97***. My rendition of the clever figure is Fig. 82 on p. 480 of ***GWU***, which didn't contain any labels. Fig. 15 is my labeled version of that unlabeled Fig. 82, which labeled version Fig. 15 is the same as Fig. 62 on p. 263 of ***GWU***. The following construction method is my best guess for what were the major details for Bessler constructing his Orffyrean roller bearing. Fig. 67 with labels on p. 270 of ***GWU*** or the bearing portion of Fig. 14 above but also showed a containing cylinder of thickness R. The nine intermediate cylinders were each initially of radius R or diameter 2R. The central cylinder was initially of radius 2R or diameter 4R. The inside radius of the containing cylinder was initially of radius 2R + R + R = 4R or inside diameter of R + R + 2R + 2R + R + R = 2R + 4R + 2R = 8R as we see in Fig. 14. The minimum value for the initial thickness of the containing cylinder, which Bessler used, was R according to the original illustration on p. 189 of which I somewhat replicated on Fig. 15 and added my understood labels. The outside diameter of the containing cylinder was according to Fig. 14 and Fig. 15 a value of 10R = R + R + R + 2R + 2R + R + R + R = R + 2R + 4R + 2R + R = 10R = three-quarters of an inch for the roller bearings of his Kassel wheel. See John Collins pp. 20, 110, and 162 of ***PM97*** for information that the Kassel wheel bearings were three-quarters of an inch in diameter. Thus, from the equation 10R = .75 inches we see that R = .075 inches. I think that this value and the following descriptions were the same for all of Bessler's bearings. From Fig. 15, I deduced that the length of each intermediate cylinder was approximately 22R. The 22R = R + 20R + R was interpreted according to another perspective from p. 189 of John Collins ***PM97*** as the length of one of the roller bearings from measurements, 3.4cm/.17cm =20. The R on each end was due to scrapings of the inserted separation plates during bearing formation, which didn't allow lobes or lobe holes to be created there in those end regions for a distance of R into the bearing on each end, according to Fig. 15. See John Collins p. 110 of ***PM97*** for information that the Kassel wheel bearings appeared externally to be made of iron. I think that the cylinders were made from molten iron using fine refractory molds. The molds were likely made by drilling. On each end of the arrangement of 10 cylinders, nine hot-rolled thin-separation-plates of iron were placed (between adjacent pairs of intermediate cylinders) to a distance of R so that the nine interior cylinders could be bound to the central cylinder by wrapping. The corners and end edges of the inserted spacer or separation plates were previously rounded so that they not catch on the exclusion zone boundaries, in the oppositely moving intermediate cylinder edges, during the bearing surface formation. The inserted portions of the inserted spacer plates were dipped in grease to a distance of R prior to binding, by wrapping, to later serve as temporary lubrication during bearing surface formation, though their exterior portions after binding by wrapping were kept clean prior to dipping them in the tin so that the spacer plates would later well adhere to the molten tin upon cooling. The thickness of each thin spacing plate was such that (where the plates touched the intermediate cylinders) the plate thicknesses covered an angle of approximately 1.05756° with respect to the center of the bearing. The measurement of plate

thickness was more accurate. It was calculated as approximately (.05212086)*R in the paragraph of ***GWU*** p. 499 with heading "Calculation of Thickness of Spacer Plates" within the section "B.3 Some Little Book Analysis" and within the paragraph labelled "(4)" on p. 435 within "15.8 More Discussion". Each end was dipped into an annular clay mold of molten tin. The inside radius of each annular clay mold was of radius more than 2R so that the tin didn't touch the central cylinder of radius 2R and left a gap for formation mixture to be later inserted. The outside radius of the annular clay mold for the molten tin was of radius much larger than 4R. For the outer wall, the inside radius of the annular clay mold for the molten tin was of radius very slightly less than 4R so as to allow constrained movement between the tin and the inside of the containing cylinder during bearing formation. The depth of the tin was more than R. The nine thin iron-spacer-plates were each of width slightly less than R by length at least about 3R (in the axial direction) to allow for spanning the approximately 1R air gap between the molten tin and the intermediate cylinders. The clay mold was carefully removed after the tin hardened. Again the outer radius of the tin was very slightly less than 4R so that it would later be just held in place by the containing cylinder, allowing slipping. The tin annulus needed to provide enough support for the iron spacer plates. After nine grooves were made in the outer radius edge of the soft tin annulus, the grooves later allowed passage of formation mixture to the outer portion gaps between the intermediate cylinders. The inner radius of the tin was less than 2.5R but much greater than 2R (for example 2.2R). The tin both allowed support for the iron spacer plates and later allowed passage of formation mixture to the inner portion gaps between the intermediate cylinders. The tin annulus contained the end portions of the thin iron spacer plates which extended beyond the intermediate cylinders. A tin annulus was similarly provided to hold the ends of the nine iron spacer plates on the other end. On each end, nine small-reusable iron-spacer-disks of radius R and just fitting lengths about R were dipped in grease (since mercury by itself would fall off and thus not provide temporary lubrication during bearing formation) and were inserted into the air gaps, between the intermediate cylinders and the hardened tin annuli, so that the iron spacer plates are not bent during bearing formation and so that the regions of non-formation of the surface lobes will not be extended by more than R into the interior cylinders (due to the presence of the iron spacer plates). There is one small-reusable iron-spacer-disk placed above each intermediate cylinder end. The containing cylinder was slightly expanded by heating so that as the cooler interior bound cylinders were unwrapped, the unwrapped end was inserted into the containing cylinder until they had the same middles.

Formation of Orffyrean Roller Bearing. After cooling of the containing cylinder, a formation mixture (equal volumes of mercury, fine ignition gunpowder balls, and purified very finely-ground ferromagnetic meteorites-and-iron) was pressed in from an entrance end. The squished formation mixture principally gets past the tin using grooves previously made in the tin. Each tin annulus end was then covered by an annulus of iron of inside radius very slightly greater than 2R

and outside radius very slightly less than 4R, so that little formation mixture would leak out but so as to little inhibit rotation of the cylinders. Ideally each covering annulus of iron just touched the annulus of tin though separated by a thin "lubricating" layer of grease. Practically there was some formation mixture remaining which also served as some temporary lubrication. The bearing was rotationally exercised to allow micro-explosions so as to asymmetrically grow surface lobes and dig out their corresponding lobe-holes on the neighboring surface. During the formation, the intermediate cylinders are held apart by the iron spacer plates. The finest grade of steel was so formed on the surfaces, except on the cylinder ends, where prohibited by the inward-most iron-spacer-plates (approximately an axial distance of R). Lobes were grown outward from the original surfaces. Slight inward pressure was applied to each covering iron annulus end to not lose formation mixture during the surface formation and to keep the tin annuli from moving outward. After fumes were reduced and the tiny explosive pops effectively stopped, the covering end iron annuli were removed. If a tin annulus came out in the process, it should no longer be needed to provide the thin iron-plate angular constraints. I suppose that then new formation mixture was similarly pressed into the entrance end (as was initially done), until new formation mixture came out the exit end. On each end the annulus of iron was reinserted with a small layer of grease to keep the formation mixture inside. I suppose that there was a second exercise cycle followed by another replacement of formation mixture. I suppose that there was then a third exercise cycle. The process was stopped immediately, whenever there was an unexpected sudden slightly tight binding due to lobes just colliding, beyond the normal bindings. That was essentially the same stopping condition for later repairing of bearings, except for there not being any tin annuli, since the nine iron spacers on each end would no longer be needed. The accuracy, of Bessler's construction of his roller bearings, was such that it allowed a maximum of approximately .500° of growth of lobes, toward a nearly touching adjacent intermediate cylinder, with respect to the center of the bearing, without lobes from the adjacent cylinders colliding. There could have been more growth, if there had initially been more perfect placement of more perfectly-sized interior cylinders or if there had just happened to be no collisions of lobes until after even greater lobe growth. Due to the geometry, versions of nearly identically-shaped replicated-lobes would never collide with each other. Such identical corresponding lobes would always be out of phase with each other, meaning that they could never collide with each other. The surface lobes could only collide with independently-formed overgrown lobes.

Finishing Orffyrean Roller Bearing. The annular tin constraint and annular iron end covering were removed from each end. The bearing was completely exercised and rinsed of formation mixture, by repeatedly using pure water and by temporarily using the iron annuli. During the cleaning, the roller bearing was repeatedly exercised, without any formation mixture, to wear off any over-extended surface lobe ends, until no more new/used formation mixture came out of the roller bearing, no more water droplets came out when tilted, and it was

very smooth in operation for rotations about horizontal axes. If not very smooth in operation, further rinsing with water, while exercising would have been necessary. By observation of the "merged" surfaces on each end, Bessler effectively statically saw that apparently each largest surface lobe rolled within its corresponding surface lobe-hole for a relative rotation angle of about 25° with respect to each other. To protect such end views of the Orffyrean roller bearing, I think Bessler cut nine "triangles" from the containing cylinders at each end of his bearings and bent down the portions in between them, without causing any extra rubbing. Because of the use of mercury, the construction procedure for the Orffyrean roller bearing should not be repeated nowadays, without proper safety and environmentally protective procedures. Also it should be emphasized that the procedures for repairing/revitalizing somewhat "worn out" Orffyrean roller bearings should nowadays, for safety reasons, be modified so that they are not revitalized, while they are being normally used. Bessler repaired them while they were being used but we should avoid doing so in an environmentally irresponsible manner. We can now repair Orffyrean roller bearings but generally we should do so in a separate place where the spread of mercury vapor can be carefully controlled.

Bessler's Wheels Used His Bearings

Bessler Wheel Construction. Bessler used pairs of his Orffyrean roller bearings to support his wheels rotating about horizontal axles. He always provided various distracting mechanisms within of his wheels to remove attention from his actual invention. His actual invented machine/device was his ultra-low-friction mechanical roller bearing. With pairs of his extremely-low-friction mechanical roller bearings, he could support massive wheels as they produced power by their rapid angular speed, according to his principle. Collins on p. 20 of ***PM97*** estimated that the 3.6 meter or 12 foot diameter Kassel wheel was 700 pounds or 318 kilograms. Bessler used eight distracting weights, which slid along wires within the outer edges of his Kassel wheel. To see an illustration of that, you may want to consider Fig. 31 on p. 111 of ***GWU*** and then consider the related discussions on pp. 107, 110-111, 356, 502-504, and 536 of ***GWU***. The weights themselves contributed to the accumulation of power by the Bessler principle but the sliding and the slamming into the outer edges of his Kassel wheel were wastes of power, which were used purely for the purposes of distraction. Likely if the weights of the Kassel wheel were firmly attached to the edges so that they not slide (so as not to frivolously waste power), then I think that the wheels would have rotated at a slightly larger final angular speed.

The many writings, letters, and certificates for the working of the Bessler wheels gave evidence for the Bessler principle.

Modern-day Bessler Wheels. When the bearings are reinvented, we can do such experiments to see if my hypothesis is confirmed. Bessler had wonder wheels because he had wonder roller bearings, which the world even now can provide nothing comparable, until the wonder mechanical bearings are reinvented. Each of Bessler's wheels had such wonderfully low friction that the wheel lost less power during initial rotations than was produced within the wheel by the Bessler

principle. Then the wheel's produced rotational power increased until there was equilibrium with the increased power removal. It almost goes without saying, when someone reinvents the Orffyrean roller bearing, thus allowing for the production of modern-day Bessler wheels by attaching an Orffyrean roller bearing to each side of a well-balanced rotationally-new wheel, then their behavior as modern-day Bessler wheels will provide experimental evidence that the Bessler principle is correct.

AFTERWORD

Regarding Solutions

Congratulations? Did you foresee specific Bessler principle solutions to the above enigmas/puzzles? If so, you need to be congratulated. You should be increasingly congratulated, if you increasingly saw or figured out ahead of time that some of those enigmas/puzzles appeared to have common solutions based upon the Bessler principle.

New Solutions. The book ***GWU*** on pp. 68-71 contains three alternate statements of the Bessler principle from different viewpoints, which statements were also provided at the end of the middle section, "Some Ideas for Solutions to Enigmas", of this book, ***MSEHNS***. If "science" rejects or does not admit that there is a fundamental physical principle of the Bessler principle, then any phenomenon which actually depends upon it will likely remain an enigma. If the principle at some time becomes scientifically acceptable, as it should be according to the preponderance of the evidences, then all solutions, which actually depend upon the principle, must at that time be considered as "new" solutions. It is my hope that we will be approaching a time when the Bessler principle will not be denied based upon "science" so that the new solutions to the enigmas will be properly allowed.

Bessler Principle Solved All Those 15 Enigmas. The Bessler principle happened to provide solutions to all 15 of the above listed scientific enigmas or puzzles or riddles or mysteries or curiosities or problems. That is the Bessler principle provided solutions/explanations for these subjects with page numbers from my free book, ***GWU***: (15~) magnetic motors of Yildiz (pp. 429-430), (14~) GEET reactors (pp. 176-198), (13~) Jupiter-Saturn excess radiation (pp. 87, 90-91), (12~) cold-fusion energy production (pp. 199-204 & 693-695), (11~) Papp engines (pp. 159-174, 698-699), (10~) McKinley low-friction demonstration, (9~) solar corona (pp. 81-95 & 394-395), (8~) earth temperature (pp. 87-90), (7~) satellites tumbling (pp. 138-139), (6~) sun energy (pp. 27 & 81-84), (5~) Coral Castle (pp. 241-250, 571-688, & 695-696), (4~) Ranque-Hilsch tube-temperatures (pp. 97-100), (3~) car efficiencies (pp. 77-78, 134-135, & 456-457), (2~) large railroad-efficiencies (pp. 78-81, 134, & 252-253), and (1~) Bessler wheels (pp. 76-77, 106-110, 152-153, 236, 505, & 688-691). I suggested some tests above but for more tests/proofs that the Bessler principle provides the correct solutions to all those above enigmas/puzzles, consider further discussions found in ***GWU***.

Principle Solves Many More Enigmas

I think that the Bessler principle provides solutions to many more enigmas/puzzles than the above 15 listed and discussed ones. That should not be

surprising, since I think that it is an ignored fundamental-physical-principle with a vast number of implications when it is applied.

Bessler Principle Solves 27 More Enigmas. See my free book, ***GWU***, with its page numbers in parentheses, for many more applications/solutions to enigmas/puzzles including but not limited to the following 27 enigmas/puzzles: (1) formation of snowflakes (pp. 95, 365, 516, 568, & 637), (2) fire suppression using strong horizontal electric fields (pp. 7 & 228), (3) fire suppression using strong vertical electric fields (p. 7), (4) fire suppression using strong vertical magnetic fields (pp. 7 & 226), (5) suppression of energy acquisition in sunspots by strong vertical magnetic fields (p. 7), (6) suppression of Papp gas explosions using strong vertical magnetic fields (pp. 7& 233), (7) rotationally new/sweet wheels (pp. 330, 341, 354, 346, 588-589, 629, & 655), (8) Saturn's warm south-pole calm-storm-eye (p. 91), (9) Venus not frozen (pp. 87 & 91-92), (10) Mars not frozen (pp. 87 & 92), (11) Mercury not frozen (pp. 87 & 92), (12) excess meteor energy (p. 93), (13) cloud thermals (pp. 93-94, 101), (14) ball lightning (pp. 94-95), (15) airglow/nightglow including nighttime radiation from the sky/atmosphere (pp. 95-96 & 365), (16) #SkyIsBlue (since #RayleighScattering is not the full explanation), (17) radiation belts, (18) magnetic bottle leakage currents (pp. 210-215), (19) jet engine partial power (pp. 96-97), (20) turbulence dependent on attitude (pp. 96 & 106), (21) wind shear (p. 100), (22) formation of tornados (pp. 96, 101, 224, 256, & 365), (23) Bose-Einstein condensation (BEC) avoidance of Bessler principle (p. 101), (24) no low BEC temperatures with horizontal magnetic fields (p.102), (25) high temperatures with horizontal magnetic fields (p.103), (26) yin-yang water-filled cylinders (pp. 236-240), and (27) sonoluminescence (pp. 403-404).

Apply Bessler Principle to Every Rotating Wheel. The Bessler principle should be applied to every wheel (whether large, small, microscopic, nuclear, or sub-nuclear in size) rotating about a horizontal axis or even a partly horizontal axis. I suggest that you study my book, ***Gravity-Wheel Unveiled*** (***GWU***). Again it is freely available near the top of https://gravityunveiled.home.blog/ in pdf form. This book ***MSEHNS*** should similarly be available at the top for free. The URL also provides my other free books ***BLBD*** and ***BEHD*** and a link to the most recent corrections to all my free books including this one. Even if a wheel is only rotating about a vertical axis, the Bessler principle should be applied because of the gravity coming from matter located at somewhat horizontal directions, including gravity coming from matter located at very distant background locations in our universe.

Correctness

Occam's Razor. Occam's razor may be stated as the simplest solution is usually the correct solution. I can think of no simpler explanation than the Bessler principle for explaining each of the 15 enigmas presented in this book. Can someone else present simpler solutions to any of the enigmas than the Bessler principle? If not, then the Bessler principle is the correct explanation for each of them individually, according to Occam's razor. It is also much simpler to have a nearly single principle of the Bessler principle to explain a multitude of enigmas (even far beyond the 15 enigmas) than to leave that multitude of enigmas

unexplained. The Bessler principle (with its understood sub-principles) provides the correct solutions to those multitudes of enigmas by Occam's razor. The Bessler principle is correct by Occam's razor.

Bessler Principle Solutions. There are many implications and much evidence of there being a Bessler principle. If by Occam's razor, people begin to understand that there is a fundamental new physical principle, which could be called the Bessler principle, then the solutions to the many enigmas, which actually depend upon such a Bessler principle, should be considered to be new to those people.

All Methods Yield Same Conclusion. I think that all the following methods (separately or together) of learning the truth yield the same conclusion that there is a Bessler principle: the scientific method, the analytical method, the academic method, and the divine method. By the scientific method we can recursively/iteratively ask questions, form hypotheses, do experiments, analyze results/observations, and make conclusions. By the analytical method regarding questions we can organize collected information, weigh the information (looking for patterns, if not a preponderance of the evidence), and form conclusions. By the academic method we can carefully study what was previously written about the questions to obtain conclusions. By the divine method we can ask questions of God to obtain revealed answers (for example Matt. 7:7, Matt. 16:15-17, and James 1:5) which sure evidence can be used in conjunction with analyses from the other methods. I asked God, on two separate occasions, prayer questions to two technical questions and I immediately received visions from God. One vision on Saturday 25 Jan 1992 in Los Angeles, California, which I call the fundamental principle of recognizable entity classification, led to my 25 Feb 2014 template matching patent (8660367 or see https://www.freepatentsonline.com/8660367.pdf coming from the idea that a recognizable entity is best classified, when it is classified directly in the equivalent space in which it is most recognizable). The other vision on Wednesday 12 Jan 2000 in Ridgecrest, California was summarized within paragraph, "Vision of How the Bessler Wheel Worked" on pp. 689-690 of ***GWU***, which with much further study and consideration helped me to figure out the Bessler principle and how Bessler likely constructed his Orffyrean roller bearings.

Awake to the Forgotten Principle. I am trying hard to wake up many people and especially scientists of this world, who by great peer pressure or group think have effectively sworn allegiance to the principle of conservation of energy. Many people have not followed the science, as they should have been doing for the last century, if not the last three hundred years or even for millennia. For a long time, there have been cases, where people have followed the science and somehow "hid" away their found information from others so that in time the information was forgotten. I am trying to make the whole world aware of the important news of the oft forgotten fundamental physical principle. Bessler in 1717 and Leedskalnin in 1936 hid their devices involving the Bessler principle, though they published coded explanations, with the decoding key being the principle itself. Papp in 1968 partially hid his invention (by leaving out information from his patents and blowing

up his working prototype) which depended upon the Bessler principle, though he may not have fully understood that it depended upon the Bessler principle. Various people (including Ranque in 1931, Hilsch in 1947, Fleischmann in 1989, Pantone in 1998, and Yildiz in 2009) may not have hidden their devices, though they may not have understood that their devices depended upon the Bessler principle. Surely the unknown presenters of the McKinley low-friction demonstration in 1968 well understood the Bessler principle. I think that those presenters (with help from God) were trying very hard to wake me up. I should have awoken, when soon thereafter I literally awoke at night to hear my oldest brother twice say in his sleep the important message, "Turn the turner." I still didn't get it. I think it was a long difficult challenge to wake me up to the message. Since then (1968), it took about 40 years to wake me up to the message/principle. Even after my vision of 12 Jan 2000 I still didn't understand the Bessler principle. It was not until about 2008 that I understood the Bessler principle. I finally understood the messages of the 2000 vision and the McKinley low friction demonstration. I was an extremely slow learner requiring direct evidence from God in the 1968 demonstration, a reminder from God through the firstborn child of my parents, a vision from God in 2000, and eight more years of study before I could at last understand what God was quite patiently trying to teach me for 40 years, according to my ability to receive the message. Then I finally understood the linked messages that God with great patience was trying to teach me. The Bessler wheels worked because there was a fundamental Bessler principle and Bessler invented such low friction mechanical bearings that the Bessler principle produced more power by its turning than was removed by total friction so that his wheels increased in angular speed until there was equilibrium between power produced by the Bessler principle and power removed (typically by friction). I at long last understood the messages that God was trying to send me in 1968. Given my history, I can understand it, if it is taking some people a long time to wake up to the Bessler principle. I am trying to be patient with others waking up to the principle, though it seems that from a trickling start a flood of information in favor of the principle is increasingly coming from all sorts of directions. There are even clues of much older devices using the Bessler principle with some ancient people apparently having understandings of the principle. Below I will attempt to consider two ancient examples, one from Egypt and another from China. I think that there are other ancient examples, when we look close enough. I suppose there have been long repeated histories of people learning about the principle and then the learned principle was somehow forgotten.

Principle Was Known in Ancient Egypt

Bessler Principle Was Known in Ancient Egypt. I am convinced that some pyramid builders in ancient Egypt well knew about the principle. If the stone blocks could somehow be steadily rolled, that would automatically provide benefit from the Bessler principle. If the normal blocks could somehow have been provided with completing portions of cylinders, I think that they could have been rolled from their quarry to at least the base of the pyramid. Rather than dragging or purely lifting, I heard that rolling "normal" blocks within wooden cylindrical-edge-

segments was one possible way to transport them. See for example https://www.ling.upenn.edu/~jason2/papers/pyramid.htm "Moving and Lifting the Construction Blocks of the Great Pyramid" by Jason Baldridge - winter 1996.

Wooden Cylindrical-edge-segments

Baldridge was aware of the 1978 method demonstrated by Bush of attaching wooden cylindrical-edge-segments to blocks to somewhat make portions of them into cylinders which could allow the blocks to be rolled. For that method of rolling normal blocks, Baldridge referred to Bush, John D. "Building Pyramids." ***Science Digest***: March 1978, pp. 61-63. Baldridge wrote, "Bush has demonstrated this technique, successfully rolling a 5000-pound block up a ramp with the help of six other men." Since none of the ancient segments found so far had any holes in them, Baldridge reasoned that it was unlikely that Bush's method was actually used, because Bush put holes in his wooden cylindrical-edge-segments to attach the segments using ropes. While Baldridge was correct that Bush's exact method was not used, we need to look closer at the solution space.

Rationale for No Holes in Wooden Cylindrical-edge-segments. I figure that one shouldn't attach the four cylindrical-edge-segments using ropes through holes in the wooden segments. Instead, one can quickly attach them by repetitively twist looping ropes over a block end to equivalently tie many successive "half-hitches" like many adjacent clove hitches in series. Instead of the hitches being tied around the other end of a rope, they are tied around the open/exposed end of a cylinder. With the segments manually held in place, extended clove hitches could be tied around the outside of each complete cylinder. That would attach the four cylindrical-edge-segments to form the wooden cylinder around the block, while providing a partial covering of the wooden cylinder. See Fig. 16 to see how the four cylindrical-edge-segments were arranged around the outside of the stone block to form a containing cylinder. The rolling would be upon the covering ropes which would provide protection to the outer surfaces of the valuable wooden cylindrical-edge-segments.

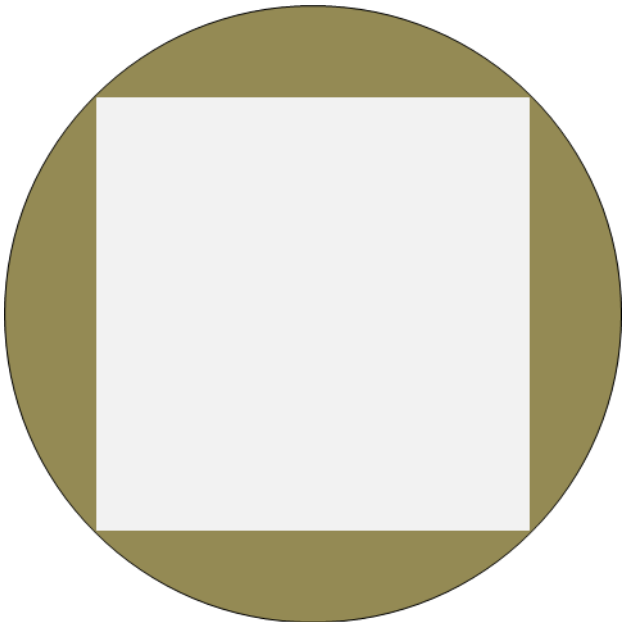


Fig. 16. Block with four wooden cylindrical-edge-segments around its outside.

Proof Knot Works Well. I obtained proof that the attaching knot works well for holding onto cylinders, while I was hiking and camping in Yosemite years ago with some Varsity Scouts of Team 68. I didn't have enough room in my smaller-older-style backpack for my "bear-proof" container. The bear-proof container had nothing for a bear to grab onto. How might one attach a rope to a somewhat slippery cylinder, which a bear can't grab? To be thrifty by avoiding buying a larger new pack, I simply tied the multi-hitch knot around the middle of the bear-proof cylinder-container. Then, I tied the ends of the knot to the outside top of my pack's frame. There was plenty of room outside my pack. It worked great for holding onto the cylinder while hiking, at least until we stopped to camp at Sunrise Creek where it worked too well. A bear crept up in the dark to my cylinder-container and suddenly grabbed my pack in its teeth. One of the sharp-eyed Scouts at the campfire loudly yelled. The bear turned quickly, the attached cylinder swung around, and the cylinder slammed into the end of a huge log. The knot well held as the bang or jolting shock somehow caused the bear to drop my pack and run away. I almost lost my pack and my bear-proof container. I resolved to thereafter immediately completely untie my bear-proof container, as the very first thing upon stopping. I didn't need to drill holes into my slippery bear-proof cylinder to firmly hold it with a rope. The knot was pack-and-bear tested.

Knot around Pencil Ends. I also regularly used the knot to well hold onto cylinder-like pencils, with strings attached to clipboards, so that rolls for Sunday School classes might be passed around for people to mark their attendance. I didn't need to drill holes in pencils to well attach them to clipboards using strings. If some of the loops were ever undone or I just wanted to add another loop, then with a twist of the loop I could easily tie/re-tie another hitch about the pencil, without access to the end of the string, which end remained tied to the clipboard. One

cannot make the knot quite as fast as simply wrapping the string around the pencil but it is much more secure. The knot became a nice cylindrical covering around as large a portion of the pencil as I desired, according to the available length of my string.

Try Making the Knot Yourself. I suggest that you try to quickly make such a knot covering near an exposed eraser end of a pencil using many twist-loops of a long piece of string, so that you better understand what I am talking about. You could repetitively: form a loop, half twist the loop (always twisting in the same direction), put the twisted loop over the eraser end, and pull to tighten the last hitch closest to the eraser end so that it makes a larger smooth covering without any gaps. You can extend the knot without any access to the ends of the string.

Back to the Point. One shouldn't drill holes in the wooden cylindrical-edge-segments to well attach the segments quickly using ropes. Holes would also limit the thickness of any ropes being put into them. The wooden cylindrical-edge-segments would be structurally stronger, if holes are not put in them. When looping a rope around the outside, there would never be any concern about running out of room outside the cylinder. You can see plenty of room outside the circle in Fig. 16. You can use ropes as thick as you desire, if you are putting them outside the cylinder. You wouldn't need to worry about tightening individual cylindrical-edge-segment sections, since, if you are reasonably careful, the knot well-tightens itself for all sections as you make more loops. It would tighten better and better as you proceed. You could later also snug up the first part with a few tugs just to make sure. The free ends could each be secured by tying knots using strings or ropes from any block packing/padding materials, to make sure that the ends not loosen up during rolling. The result is a well-compressed covered cylinder squeezed and held in place much better than if one just wrapped rope around the circular center region of the cylinder, then tying the ends. For a tiny bit of extra twisting effort, one gets a much more secure gripping knot. The knot can be tied almost as quickly as wrapping the rope around the cylinder. It is similar to wrapping but with an extra twist for each wrap. The knot would have required much rope (about the same as with purely wrapping) but the valuable rope protected something more valuable, namely the wooden cylindrical-edge-segments. The long ropes could have been left over or repaired after being long used for more critical projects. It was not essential that the best/newest ropes be used for covering the cylinders.

For best structural support and for best protection of the wooden cylindrical-edge-segments, one shouldn't drill holes in the wooden cylindrical-edge-segments to well attach the segments using ropes.

Normal Pyramid Blocks Were Rolled

Wheel Archeological Evidence. Given the solution that the wooden cylindrical-edge-segments should not have holes drilled in them to well secure them to blocks, I think that the archeological evidence shifts in favor of normal-size pyramid blocks being efficiently rolled during some portion of their journey. Based on this evidence, I think it is wrong for anyone to claim that the Egyptians didn't have the wheel available to them. Such relatively easy rolling of blocks using

cylinders to transport heavy normal-size blocks indicates that they wisely used actual wheels rotating about ultra-low-friction "axles". I think that low-friction wheels were directly used to transport vast numbers of pyramid blocks. Doing such would have saved much effort. The Egyptians understood the great utility of the Bessler principle or the idea of rotating massive wheels about horizontal axes. Where is the archeological evidence for the many ultra-low-friction wheels? The evidence is in the vast numbers of existing blocks and the corresponding-size surviving wooden cylindrical-edge-segments sans holes, which have been discovered. I think that some ropes have been found. I won't say that the wooden cylindrical-edge-segments were never used as baby cradles but that was certainly not their primary/original purpose.

Choice of One or Two Cylinders per Block. Either one can put a single wooden cylinder around the center of each normal block or one can put a wooden cylinder around each end, assuming the block is long enough and the wooden cylinders on the ends are narrow enough. Blocks having just one cylinder in the center of it might avoid potential problems of sustained turning in only one direction due to slight differences in circumferences of end cylinders. Blocks having just one cylinder in the center of it might allow small turning, by leaning the cylinder slightly to one side so that the rolling is on both the rope portion and the edge of the wooden cylinder. Leaning blocks during rolling could potentially nick a block corner. It would also not be smart to damage the edges of the wooden cylinders because of the leaning during rolling. Blocks having one cylinder in the center of it might be less stable regarding pulling using ropes looped around the block ends. Blocks having two cylinders per block would be more stable with respect to pulling using ropes looped around the block center. Blocks having two cylinders per block could be slightly steered by putting soft objects (such as portions of old ropes) in front of one cylinder so that rolling over the objects would cause the block to turn away from them. It might be beneficial to avoid needing to lean blocks or having to continually lean blocks which had not been well centered on their single cylinder. Though I suspect that the Egyptians may have started with only one cylinder in the middle of each block (to save on wooden segments and rope), I suppose that they soon switched to having one cylinder near each end of a block, for reasons: of stability, of protection of blocks, of protection of the wooden cylindrical-edge-segments, and of reduced loading on the wooden cylindrical-edge-segments. Using a cylinder on each end could be compared to transportation by mobile railway tracks moving wheels with very-low-friction axles.

Rolling on Ropes. Pure rolling doesn't produce much wearing but rolling compression on the ropes may contribute to slight wearing on the ropes when there is dirt within the fibers. Despite extra wearing on the ropes, I suspect that it was worth it because of less overall wearing on the wooden cylindrical-edge-segments. Any unlikely failure in a rope would not cause a sudden failure in the total knot holding together the cylinder around its block.

Knot Twist Direction. After tying about half the desired number of hitches for a cylinder, one could reverse the twist direction to make each new hitch. That

would change the diagonal pattern of slight bumps into a V-shaped pattern. That could balance the tiny bumps but I like the consistent diagonal pattern better, since I think that it holds better. The twists could be done on the separate cylinder ends so that the diagonal pattern of slight bumps would be symmetric about the middle of the block.

Least Effort Required When Rolling over Horizontal Surface

When there is a horizontal surface, I think that people could roll a block by pulling and pushing, with much less effort than when sliding the block along using a sledge. The reduction in effort could be both because of lower friction from rolling and because of the Bessler principle. The least-fiction invisible "axles" would then be implicitly used by this process of rolling the blocks. I think that the rolling benefits, regarding reduction of effort while transporting blocks, would suggest evidence in favor of normal size pyramid blocks being rolled during some portion of their journey.

Larger Direction Changes. Larger changes in direction might have been benefited from larger turning radii when a block was heading toward/around the pyramid and also after the block was moving around easily to its proper location upon the desired pyramid level. In any case where turning space was quite limited, a large change in direction could be made by repetitively rolling a cylinder block forward and backward, while alternately switching the side for which a soft object was laid down for the cylinder to roll upon.

Extra Pulling Supplied When Rolling Uphill

If there is an uphill slope of the ground, extra pulling can be supplied by fastening an end of a rope to a point on the ground (say about the base of a firmly placed post perpendicular to the pulling direction), looping the rope around the exposed block center portion (assuming wooden cylinders on each end), and pulling forward on the free end. There would be about a two to one mechanical advantage supplied by any such rope in that for about every two royal cubits of rope pull there is a more concentrated effort of the cylinder moving a royal cubit. Ignoring the center of the block not being round and the same circumference as the cylinder, I said "about" in case the rope directions are not quite parallel to the path followed by the block. For slight deviations, it would be approximately a two to one mechanical advantage. There could be extra slipping between the rope and the stone associated with occasional extra pulling of the rope, because either the rope on the ground was not perfectly straight or there was less distance of the rope path around the center of the block than the comparable rolling path of the cylinder providing extra rope needing to be pulled. Any slight extra slipping beyond two to one (of extra rope being pulled) doesn't produce any actual mechanical advantage beyond two to one. Some pulling/slipping can cause extra wearing on the rope.

The rope could be effectively looped about the center of the block, by the rope previously having been placed in the center of the path. After lifting the rope over the top of the block, the block could be pulled from the front using the rope. Later, when the pulling begins to approach the place where the rope is attached, it could be lifted back over the block so that the rope again lies on the center of the path for

use by the next block. I think that ropes could be changed, when the blocks stopped rolling and were secured. Workers could carefully arrange ropes on the ground ahead of time for later pulling.

I think that using ropes when pulling cylinders up inclines would provide a large reduction of effort for transporting normal blocks relative to that when using sledges. I think that sledges would increase friction, would not allow for two to one mechanical advantage during pulling, and would not allow the Bessler principle to be used. Using sledges rolling upon logs would create occasional problems of needing to transport massive logs (when needed at different locations), of the logs jamming up, and of logs sinking into any sand thus causing much friction. It is better for the workers to automatically transport any needed very-low-friction wheel cylinders during block transportation so that there is not any extra need to transport additional wheels to move the blocks. In other words, the block cylinders themselves were the only wheels that were transported so no extra wheels needed to be transported with them.

Blocks Rolled up Pyramid Sides

I think that normal blocks were rolled up the sides of the pyramids to the places upon the tops where they were used. It would be most unwise to unpack the blocks from their containing cylinders at the base of pyramids, when they would need them again to easily roll them around to their proper locations upon the tops of the unfinished pyramids. As long as the wheels/cylinders were available, they might as well been used to transport the blocks up the sides.

Extra Pulling Supplied When Going Up Pyramids. The idea of using ropes can be extended to pulling blocks up the faces/sides of a pyramid. I suspect that initially the blocks were simply rolled up sides of a pyramid from one block step to the next, by pushing and by using enough people to pull on ropes having end-anchor points. That would provide a stop with each pyramid step, assuming bracings were provided for the stops. Later there could have been combinations of both smooth slopes and desired-size steps. With sufficient bracing at resting stops there could be just smooth paths for each cylinder. Pulling ropes could be tied off to supply extra bracing at rest stops. The resting-stops could have been at locations where ropes were changed, which could have been when attachment points/posts were close enough. I think that with time the builders made improvements to make better use of leveraging to save them more effort.

Having portions that were smooth paths could allow larger angular speed to be used, which would automatically allow the Bessler principle to better contribute to transporting blocks up a face of a pyramid. It might also have been easier on worker teams to use smooth paths to reduce time/effort spent in pulling, by avoiding strenuous places of near vertical lifting of blocks.

Corrections for Veering off Smooth Paths

For blocks normally having a cylinder on each end (two wooden-edged cylinders per block with each protected by the rope knot covers) there might be a slight problem of a block beginning to veer slightly off a correct smooth path. That could be easily solved by inserting or pre-inserting soft materials off to the sides, with

larger/more soft objects further off the path. That could induce the block to correct itself and somewhat go back onto the correct path. There likely would be some judgment in applying the correct size/type of object in the correct location at the proper time to help bring the block closer back to the correct path.

Ideas for Rolling Normal Blocks up Pyramid Faces

I think that it would have been simplest to directly roll normal blocks up temporarily smoothed ramp paths of pyramid faces. I wonder if the temporary smoothed off ramp paths could have been actually smoothed off portions prior to the final surface smoothing/polishing. Here are some more ideas about how the builders might have further reduced the effort expended, when rolling normal blocks up part of a modified pyramid face. I think the builders learned by attempts to increase leveraging that the workers curiously expended much less effort, when they rotated other cylinders/wheels about horizontal axes, first using low friction axles to wind up the pulling/safety ropes. I suppose that low friction axles may have initially used finest-limestone-powder lubricants (from limestone/metal axles rubbing upon limestone supports), if well-lubricated roller bearings were initially not available. Hardened copper/bronze, if not iron/steel, might have been used for precious lubricated roller bearings. Anciently technology was often produced, kept secret, and lost. I think that the builders would expend even less effort, when the cylinders or winding wheels, for winding up ropes, were more massive and when they were rotated faster (according to the Bessler principle). Then, there may have been more massive cylinders rotating more rapidly by hand to rotate by chain connection (with greater mechanical advantage) the slower rotating axles winding up the ropes, which ropes rotate and pull up the blocks. Though the builders may have initially supplied the extra rotating axles/cylinders only for the purpose of extra mechanical advantage, I think that in the process of time they automatically discovered further benefit by the Bessler principle, which provided greater labor saving. Devices/procedures where fewer people were needed to do the same tasks meant that those were the devices/procedures which would tend to dominate the work.

The builders expended even less effort/work when there was less air friction, which occurred when the more massive cylinders or winding wheels were mainly in the shape of cylinders of reduced radii. I imagine that there could be a rope winding cylinder chain connected to a more rapidly rotating more massive cylinder which was chain connected to an even more rapidly rotating more massive cylinder. There could thus have been three somewhat massive cylinders chain-connected at each lifting station. The two extra chain-connected cylinders may have initially been added just for improved leveraging, until it was discovered that their rapid rotations were also quite valuable for reducing work expended, according to the Bessler principle. I don't know if the gearing/leveraging circumstances would have required more than three chain-connected cylinders for the end cylinders to rotate sufficiently rapidly. I might guess that three were sufficient.

Use of Axles/Bearings. The further use of the Bessler principle might have been limited by having enough low/lower friction axles/bearings. I think that they

likely had used them where much critical pulling was needed, without getting people tired. If they had them, then they would have extensively used them. Low/lower friction axles/bearings would have been extremely valuable and not lightly discarded. They likely would have been used for other projects and repaired when necessary. Though extremely valuable in this life, the Egyptians might not have considered the axles/bearings necessary in an afterlife to build pyramids or burial places. That might explain why low/lower friction axles/bearings were not found in tombs. When no longer useful, hardened copper axles/bearings could have been melted down and used for other useful things such as new axles/bearings.

Small Teams at Each Lifting Station. With much leveraging and a massive end stone cylinder rotating sufficiently rapidly about a horizontal axis, the Bessler principle would have been doing nearly all the heavy lifting-rolling, which would have allowed a team to be small at a lifting station. A lifting station team for rolling a normal block up a portion of a side of the pyramid might have been composed of six people. Two people could somewhat rapidly turn an intermediate cylinder using leveraging handles at the ends of the cylinder. I think that they would have been mainly fighting friction. Two people could have each used a pole to help direct the take up rope onto the slower rotating axle/cylinder to wind up the rope, which rope pulled on the top middle portion of the rotating block. A couple of people could have inserted things on the smooth path or removed things from the smooth path to make sure that the rolling block, with a cylinder on each end, remained rolling somewhat on the path center. Upon stopping, the last four people could serve as bracing people to insert bracing materials and the first two people could have applied lubrication. Except possibly when just starting off, there would be no people rotating the fastest-rotating stone-cylinder. The people could trade places after rolling a block up to their station so that no one got too tired or too worn out. The lifting stations could have alternated sides to avoid interference between the current and the next rope, when both ropes were wrapped halfway around the middle of the block during the transition between the two. To make sure that a block would not roll back down, the lower elevation station would not release tension on its rope until the higher elevation station provided tension and there would have been sufficient extra safety bracing put in place during the transition. The higher elevation station might not begin rolling the block upward (on its continued journey) until the lower elevation station had completely unwound its rope so that rope could be placed in the center of the smooth path for the benefit of the next block coming up. When well using the Bessler principle, it was almost as if the block-cylinders transported themselves up the sides of the pyramids.

Choice of Egyptian Pyramid Faces. Selected Egyptian pyramid faces would contain at least one route of lifting-rolling stations. Likely there was only one near the center of the face so that it might eventually go to the top. Near the end of pyramid construction at the top, there may have only been one face having a route of stations going to near the top point of the pyramid so that some rotational power would be available near the end of top construction. The laborers could rest when conditions did not allow the rolling of blocks up any particular face having lifting-

rolling stations. Many of the laborers/workers may have appreciated working when temperatures were slightly cooler so that they not get too hot. Warm protective clothing could have been worn, if needed. With high temperatures being the greatest temperature concern during each year, the lifting-rolling might have been restricted only to the two western pyramid faces (NW and SW) to take advantage of the early morning shading on days when there were high temperatures. If those were the only faces used, then many people on the east would not be able to see the blocks going up the sides of a pyramid. They might have seen blocks going out to or around the pyramid and then later appearing on the top level, as if something mysterious was going on, which was hidden or forbidden for people to see.

Though we can see the gross effects of the Bessler principle, normally the Bessler principle itself is well hidden from our view, with our being forbidden to see the innermost mechanisms, until our eyes are purer (consider Doctrine and Covenants 131:7-8). The word "Egypt" signifies "that which is forbidden" as we see in Abraham 1:23. The knowledge of the Bessler principle may have been somewhat withheld from the general Egyptian population.

With the western pyramid faces hidden from the view of people on the east, there may have been practical reasons for blocks generally going up only on a hidden west face. There was likely not enough equipment to have lifting-rolling stations on all pyramid faces. The pyramid faces used would need to make best use of available temperatures and times. When needed, the workers could have worked during the cooler times of the morning, where the local west portion of the pyramid had been shaded more recently. Then they could have rested when the temperatures were higher. Thus, some of the withholding of their technology to the public may have been accidental or not intentionally hidden. I think that it was more important for them to have the option of working under cooler morning conditions even if they had to pay the price in time and effort of rolling block cylinders over a level surface further around to the far west side of the pyramid.

Moving and Lifting Massive Slabs

The lifting-rolling of long-massive 50 ton slabs up a face of a pyramid could be done if either wide gradual paths were available or the slabs were brought up earlier, as Baldridge suggested was a possibility. The lifting paths could be done quite incrementally, if done earlier, by lift-rolling a slab one block level during the time of construction of the block level. Otherwise a number of lifting-rolling stations (~20=50/2.5) could be used simultaneously to roll a long-massive slab up a side of a pyramid. Ropes could be lengthened so that more lifting stations could contribute to the pulling. If there were pulleys, then more lifting stations above, to the sides, and below could also contribute. Huge effective cylindrical-edge-segments could have been attached to the slab ends with the centers of cylinder ends forming a line going through the center of mass of the combined slab and its cylinder ends. The huge cylindrical-edge-segments could be constructed from wedge portions to better support radial loading, with xylem cell fibers (that is wood grains) oriented somewhat radially outward from the center lines of the cylinders. The radial wedges could be similarly held together by the covering knot made of many hitches

around and outside the cylinders after the fashion of extended clove hitches. I also think that rolling around a massive slab on a temporary top level of a pyramid would be much easier, if it had cylinders for its ends, than if it were moved using a sledge. While a pyramid side was occupied with the rolling and lifting of a massive slab, normal blocks might need to go to another side to find routes to lift-roll them to the current top of the pyramid. I think that moving the massive slabs earlier would have been easier.

Prior to reaching the pyramid, the moving of huge slabs (with a cylinder possibly on each end) would depend upon the spaces available for moving them. Long massive slabs could be temporarily placed on sledges. Narrow paths may have required sledges and slightly wetting any sand (see https://www.washingtonpost.com/news/morning-mix/wp/2014/05/02/the-surprisingly-simple-way-egyptians-moved-massive-pyramid-stones-without-modern-technology/ Terrence McCoy May 2, 2014). Surely the Egyptians would have avoided bringing up the long massive slabs, through narrow paths as much as possible. They could have chosen to roll the long massive slabs to the pyramids, if at all possible. It might have been advantageous to roll huge slabs around the western side which had more open desert, if some water or footings could be put on the sand in front of the rollers.

Summary Steps of Increased Use of Bessler Principle

I think that the pyramid builders saved much effort and friction by rolling normal blocks, which used the Bessler principle. Using ropes for pulling the rolling blocks would have given a two to one mechanical advantage. Greater angular speed from the rope pulling would allow more benefit from the Bessler principle. Winding up pulling ropes would have been a reasonable next step for better safety, convenience, and leveraging. Other more rapidly-rotating more massive chain-connected-cylinders supported by axles would have been reasonable further steps for purposes of increased repetitive leveraging and control. With greater experience, stations for lifting-rolling would have surely been tailored to allow more exploitation of the Bessler principle. Increased rotational leveraging would have greatly increased benefits from the Bessler principle, especially if more massive cylinders, having low bearing friction and low air friction, were rapidly rotated about horizontal axes. Nearly every step in the leveraging progression allowed the Bessler principle to make greater contributions. I am sure that the builders knew about the Bessler principle, which increased their power and magnified their efforts. I don't think that people could build such huge pyramids out of massive ~5000 pound (= 2.5 tons) rock blocks, without becoming well aware of the fundamental physical principle. If there were not enough lifting-rolling stations available on a single face (~20) or assisted by enough other people with enough other ropes to do extra lifting-rolling of the massive slabs, then they would have had to have brought them up incrementally.

Return to Science to Test Ideas for Pyramid Building

Has anyone done experiments in modern times (using rotationally linked stages of massive rapidly-rotating cylinders and normal roller bearings/axles) to see if

massive cylinders rolling up a steep incline reduces efforts expended as I described? To remain rotationally new, the cylinders must not be rotated too rapidly.

Principle Was Known among Ancient Chinese

Yin-yang Symbol

I am convinced that some ancient Chinese knew about the principle, with evidence according to the oldest available versions of the yin-yang symbol. I think that the symbol suggested the rotation of massive water-filled two-part cylinders about horizontal axes, with hot spots where the dots were then located. I think that Edward Leedskalnin also came to the conclusion that the pyramids in Egypt were built using the principle as was represented by the yin-yang symbol. See a modern variant of the symbol by Leedskalnin but without any dots as seen in the middle portion of Fig. 87 on p. 583 of my free book ***GWU***, or see Fig. 1 on p. 14 of my free book ***BEHD***, or see approximately the figure on the copyright page of Leedskalnin's 1936 book, ***A Book in Every Home***. Leedskalnin was using the principle with low friction rotations about horizontal axes but he was using it in such a way that it didn't create rotationally hot nuclei or hot spots. I tried to illustrate the most ancient placement of the spots/dots on the symbol and the most ancient boundary curves in Fig. 17 below, which is the same as in Fig. 54 on p. 237 of ***GWU***. It is approximately like a figure by John Collins on the right side of p. 222 of ***PM97***, which provided a depiction of the most original version of the symbol available to me. Its boundary, between the halves, was closer to a straight line "as an almost elongated 's' shape" or mirrored image for the other end of the cylinder. Unlike modern versions of the symbol which use half circles for boundaries with the dots closer to the centers of the half circles, it appeared to me that those most ancient figures/symbols showed the dots as located furthest away from all the edges. By that I mean that the dots were approximately at the location in which the distances to the edges over all directions from the center of the dot were greatest.

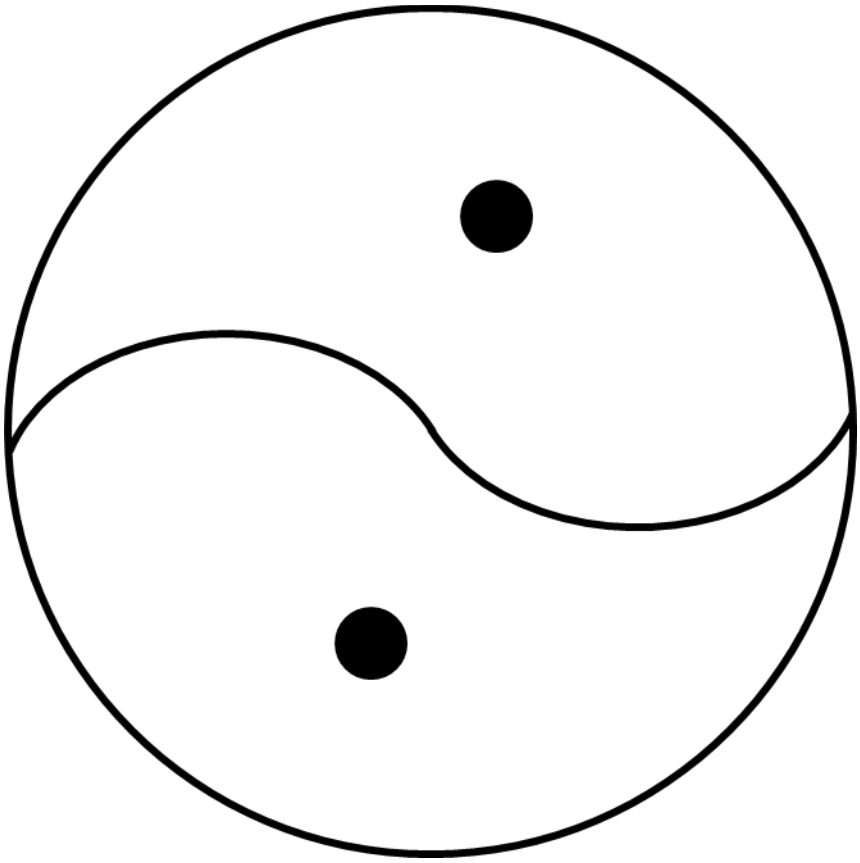


Fig. 17. An end view of an ancient yin-yang cylinder.

I think that the dots would be the locations, which provided the least rotational interference. I think that the centers of the dots represented the locations where water molecules could most rapidly rotate about horizontal axes, thus providing the most heating by the yin-yang principle, which is the Bessler principle. Those locations would provide hot spots on the ends of the water-filled rotating cylinders with boundaries of almost elongated 's' shapes rather than modern two half circles. The hot spot dots would have the same locations whether the rotations were clockwise or counterclockwise, since in both cases I think that the dots would be the locations of least rotational interference for the water molecules. My analysis seems to explain how such a curious most ancient version of the symbol could arise, especially if we consider some ancient washing machines.

Washing Machines

I suspect that some ancient Chinese pragmatically built devices to serve as "automatic" washing machines, with the machines supplying some of their own higher temperature water. If such a cylinder were rotated about a vertical axis, then the clothes would clump at the bottom end and not be washed. If such a cylinder were rotated about a horizontal axis, the clothes would not clump and would be well washed. The chambers could have been for washing and/or rinsing. The boundary between the compartments would have needed to be in an almost elongated 's' shape to allow the clothes to somewhat rotate without the boundary

"grabbing" them. Since the 's' was almost elongated, it gave better structural support than the modern shape with semicircles. I imagine that the machines were powered using an external source of power, with the principle supplying some slight extra power especially apparent in the curiously placed hot spots where the dots are. The hot spots might be most apparent during machine pre-washing and self-cleaning cycles, with only water (without any clothes being washed) which could allow for the greatest rotation of water molecules at the location of the dots. A long enough pre-wash cycle might well heat the water prior to clothes being added for a wash cycle.

Other Projects

I think that the symbol represented turning as a means of producing rotational power. I think that they also used the idea within many other projects not related to doing laundry. Still, I think that many of those ancient projects were associated with the yin-yang symbol. The symbol meant much more than rotating two-compartment water-filled cylinders about horizontal axes. For example, I think that there were projects of massive logs rotating about their horizontal axes of symmetry and rotationally connected to other similar cylinders but either rotating faster or supplying extra benefit in rotating. I suspect that some of the ancient projects with combined leveraging using low friction bearings greatly assisted in turning things, as long as the most rapidly rotating cylinders were not rotated too rapidly about horizontal axes. Logs for the Chinese may have worked, since they were initially rotationally new. I don't know if they fully understood the concept of rotationally new. I don't think that today we have done sufficient experiments to fully understand the boundaries of the concept of materials being rotationally new. To fully understand it, means in part we know that capabilities are destroyed for cylinders, which were rotated too rapidly.

Modern Yin-yang Experiments. Has anyone done experiments in modern times (using modern ordinary low-friction roller bearings/axles) to see if such yin-yang related things would happen as I described? Are there hot spots and if so are they located where the most ancient drawings seemed to indicate according to Fig. 17? Can we do modern-day experiments with massive log cylinders to produce greater mechanical assistance and to determine the rotational angular frequency beyond which there is permanently degraded assistance? We would want to do the lower frequency experiments first and slowly approach higher frequencies, since the degradations of assistance are expected to be permanent. After we learn of a rotational angular frequency associated with power degradation, we would want to mark rotationally damaged materials (with the frequency that it was exposed to) and to stay below the learned frequency in future efforts using rotationally new materials. Would such a rotationally-new boundary-frequency change when switching to other materials, such as going from wood to stone to iron to stainless steel? I am supposing that some of the stainless steel lattice connections may reform after being subjected to very rapidly rotating nuclei (destroying some lattice connections). I suspect there would be some permanent losses of capabilities associated with such loss and reforming of the lattice connections. We should avoid

the rotational angular frequencies associated with the loss and reforming of the lattice connections. With low enough rotational friction, power production from the Bessler principle increases with rotational speed to the point where there is permanent degradation of the power production capabilities, according to Leedskalnin. Upon learning those rotational frequencies, I think we would need to stay away from them. We shouldn't trade increased assistance or power production (including thermal power) in the short run for decreased useful mechanical power production in the long run.

Other Names of Principle. I think that the Bessler principle could be called the yin-yang principle or the ED.L. principle or the stone mason principle depending upon the specific use of the principle in history (by whom used and when used).

Olmecs Rolled Massive Stone-pre-heads

I think that the archaeological Olmecs rolled massive stone-pre-heads from the Tuxtla Mountains to their eventual locations at say San Lorenzo, where the final shaping of the stone heads would have occurred. The massive stones include monuments weighing 20 tons. As suggested by Fig. 18, if they had simply rolled massive stones rather than dragging them or putting them on a sledge, then they could have avoided much friction and they would have made much use of the Bessler principle. Since they transported massive amounts of earth to fill in low spots, the Olmecs would have surely built highways and bridges to aid transportation.

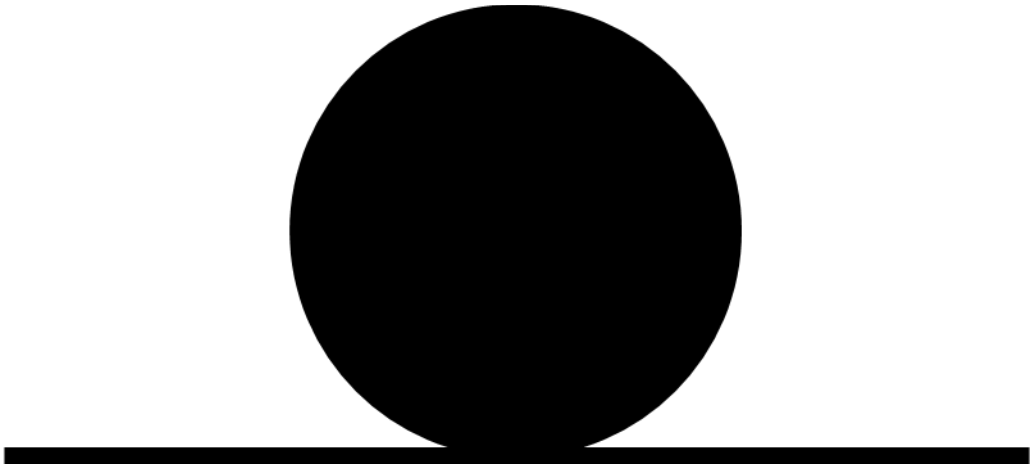


Fig. 18. The Olmecs rolled massive stones.

Rolling of Pre-heads. How could the pre-heads be rolled? A rope could be looped around the back top of a giant pre-head boulder so that the two ends could be pulled from the front. There could be hooks used in the back to pull the ropes out then down, between the jerks from the front. Alternately the ropes could be attached to axle ends with a wheel on each axle end to avoid friction between the rope and the stone. There would still be a need to pull down on each axle end to avoid the axle going up too high because of pulls from the front. The pulls from the

front would then not need to be done in periodic jerks. Pushing directly or pushing from the back using poles could be simply used to move or to reduce movement. Several people could work a pole and could quickly move to where they were needed most. Leverage could be used by putting a sturdy pry bar at the back bottom of the huge boulder and lifting up. To guard against the stones rolling too fast when going downhill, objects such as appropriately-sized logs could be pre-positioned or other things could be thrown in the path, if the need came up. In a worst case situation, the rope ends in front might be quickly wrapped around in one direction to pull from the back, while leaning logs could be quickly placed to try to stop the momentum of the massive rolling boulder. There could have been a similar "loop" around the front with a slightly lower axle as a safety measure but I am not sure if such extra efforts would be necessary in general. Maybe they would only be needed when going down a steep grade. To guard against the stones rolling backwards, when going uphill, bracing logs could be placed behind them. If there ever was a runaway stone, it might cause the stone to be bumped hard and break apart. A massive stone pre-head would have somewhat verified its structural integrity by getting through the transportation process intact.

Long Stone. If the pre-head or monument was long, then it could have been rolled along its smallest circle or rolled about its longest axis going through its center. Poles for pushing might have been more useful than ropes about its back, though a long axle with a wheel at each end could have been held at its back near its top so that ropes could have been tied to the axle ends to allow pulling using ropes from the front. Preferential pulling or pushing on at least one end would have allowed it to slightly change its direction. In case a long stone ran away to the front, it would have been best for the people pulling on ropes to just get out of the way.

Olmec Stone Transportation. I watched a show on Story Television on Wednesday 23 April 2025 about how large stones might have been transported, by land and by water. They tried to move large stones by dragging a stone directly, by dragging a sledge with a stone on top, and by using boats covered with a flat surface on top of them, with a stone on top of the surface. I was rather surprised that they didn't try to roll the stone. Rolling is normally the first thing that I do when I need to move a very large stone in my yard. They showed a case of an ancient massive stone, which had a portion broken off and then the stone was abandoned. There was a protrusion jutting out from the side of the abandoned massive stone.

Possibly Moving a Massive Stone with a Protrusion. Though it was not obvious why there was a protrusion, I suppose that such a protrusion could have been on the axis of rotation for the purpose of slightly changing the direction, in which the stone was rolling. Such a protrusion could be pushed or pulled. That could be done by pulling with a rope (looped about the protrusion) from the front or the rear, depending upon which way it needed to be directed. Pushing protrusions with poles might work well for changing direction slightly. Pushing the massive rock with poles might especially help to change the direction slightly as the stone is being rolled. The main front two ropes could also provide some steering by pulling

somewhat harder on one side. After the transportation was completed for a pre-head, I imagine that any extra protrusion would have been removed. A pre-head would not need a protrusion to be transported but such a protrusion might be of assistance during transportation of a pre-head.

Did Olmecs Have the Wheel? I heard it said that the Olmecs did not have the wheel but on p. 122 of ***In Search of Cumorah*** (1981) by David A. Palmer (***SC81***) it showed an example of a toy having four wheels, which toy was found at Veracruz. Many toys with wheels have been found. If the stone pre-heads were transported by rolling, then they would often have effectively been using wheels rotating about ultra-low friction axles. For discussion of "C.5 Ordinary and Lower Friction Wheels" see pp. 464-466 of ***GWU***. See paragraph "Steel" on pp. 664-665 of ***GWU***. I wrote, "The Jaredites coming from the Old World to the New World had steel about 2500 B.C. or within two hundred years after their arrival after about 2700 B.C. See Ether 7:9 and p. 128 of ***SC81***." The Olmecs could have had iron/steel bearings, axles, and the wheel. The abandoned broken pre-head better fits the situation of the pre-head being rolled rather than that the pre-head being transported by wagons having wheels. Using wagons rather than rolling pre-heads would have replaced ultra-low-friction wheels by wheels having greater friction and without as much use of the Bessler principle. Using wagons rather than rolling pre-heads would have also increased the loading problems for bridges. Wooden grooves laid upon extra supports could have been used to guide the rolling of massive stones over bridges to distribute the loading, while protecting the bridge surface. Wagons may have been useful for hauling such things as fill earth, construction materials, trade goods, and produce. The archaeological Olmecs had something better than wagons with wheels for transportation of very massive things. They had direct transportation of massive monuments, using special wheels with ultra-low friction axles, having much additional power from the Bessler principle to directly assist in the transportation of the massive monuments. Did the Olmecs know about the Bessler principle? If they didn't know about it, I think that they nonetheless acted to make very great use of it.

More Olmec Information. If people want to know more about the archaeological Olmecs, then I suggest that they read about the Jaredites (or descendants of Jared, his brother, and their friends) in ***The Book of Ether***, which is the second to the last book within ***The Book of Mormon: Another Testament of Jesus Christ***. The Jaredites were circa 2700 B.C. until their self-destruction circa 600 B.C., according to the chronology on p. 128 of ***SC81***. On p. 426 of ***GWU*** I wrote, '… in Ether 3 are the words "Jesus Christ" in Ether 3:14, which I consider to be the chiastic center of a large chiasm for the entire Book of Ether. That chiasm has a huge number of levels. On one counting, I counted 105 chiastic levels, …' There are 15 chapters in Ether so the chiastic center in chapter 3 is not near the chapter 8 center. In my scriptures, Ether starts on p. 487 and ends on p. 518 so the chiastic center of Ether 3:14 on p. 493 is not near the page center between p. 502 and p. 503 (within chapter 9), which page center was estimated to be circa 2430 B.C., for the ancestor of Ether named Omer, in Palmer's "Jaredite Chronology" on p.

128 of ***SC81***, which was near the time of the initial settlement on the east or gulf coast corresponding to the Olmec heartland.

Will People Increase in Doing Real Science Concerning Bessler Principle?

Bessler Principle Curiosity. As near as I can tell, there has been an amazing lack of curiosity with respect to scientifically investigating things related to the Bessler principle. Whether it is rotating cylinders in space or doing cold fusion experiments or building ancient Chinese washing machines or trying to easily roll massive stone blocks up ramps using lifting stations or reinventing the Papp engines or tilting vortex tubes at angles, I think we need to increase in our curiosity. I would have thought that the perpetual motion machines invented by Yildiz (or magnetic motors of Yildiz, pp. 429-430 of ***GWU***) would have gotten people to be more curious. Hopefully the situation will slowly begin to improve with time as progress is made. I hope that progress will stimulate more study, which will lead to more progress. Even if people don't believe all of my speculations about the past (in the absence of their doing any related modern experiments and tests), hopefully they will at least pay attention to my many solutions to scientific enigmas, my many associated analyses of devices, and my many suggested experiments in ***GWU*** and in this ***MSEHNS*** for testing the Bessler principle. Hopefully three devices will need to be reinvented using my instructions so as to allow the production of much energy by the Bessler principle:

1. Do my suggested improvements (including the use of horizontal magnetic fields) for reinventing the Papp engines improve energy production results?
2. Can someone build Orffyrean roller bearings according to my specifications found here in ***MSEHNS*** or in ***GWU*** or in ***BLBD***, and if so would they provide reinvented modern-day Bessler wheels, which work as energy productive devices?
3. Can someone build a reinvented version of the Sweet Sixteen family of cylinders, according to my specifications and rules of use found in ***GWU*** or ***BEHD***, so that it produces energy? It can be of Ed's symmetric compact form (see Fig. 11 above, which is the same as ***GWU*** Fig. 91 on p. 619, which is also ***BEHD*** Fig. 5 on p. 14) within his frame or Ed's more spread-out non-centered form (see ***GWU*** Fig. 69 on p. 276), which he did not implement due to space constraints within his mobile supporting frame. In public, Ed publically used his frame as merely a trailer to haul items, when he moved his Rock Gate Park (see pp. 615 and 645 of ***GWU***) to its new location. See above in section "5~ Explanation for Coral Castle" Ed's drawing of the uncovered front view of his device within his frame in Fig. 8, which may be compared with the front view of the compact version of the Sweet Sixteen family of cylinders shown immediately after in Fig. 9. Ed always had his Sweet Sixteen family of cylinders available whenever he needed to do much work.

I will not say that these three devices (Papp engines, Orffyrean roller bearings, and Sweet Sixteen family of cylinders) will be the only devices allowing perpetual-motion to come forth. We already have perpetual motion "devices" of the sun and the magnetic motors of Yildiz. I am telling about how to reinvent those three mentioned devices associated with perpetual motion , which I think will in the long run be much more energetically cost effective or least expensive in

dollars/(kilowatt*hour) than extracting energy from the magnetic motors of Yildiz or from the sun (by solar electric cells). I suspect that using the Yildiz device(s) will be more energetically cost effective than using solar electric cells. The Yildiz device(s) have the advantage that they can operate 24 hours per day for seven days each week, whatever the weather or wind conditions. In the near run, we should not neglect the nearly perpetual-motion-devices associated with the GEET reactors, which with other help from say Tesla turbines or Papp engines or cold operating conditions to cool down the returning exhaust might become nearly closed-cycle perpetual-motion-devices. For example, nearly closed-cycle GEET reactors might be useful for producing power and some heating during winters. Even when not configured to be nearly closed-cycle, with some fuel assistance and if plenty of cool water is available, the GEET reactors can produce power 24-7, without worrying about weather conditions. With further research, some non-perpetual-motion cold fusion or GANE devices could become quite energetically cost effective, though I suspect not as cost effective energy-wise as any of those three primary devices needing to be reinvented, which I suggested above.

Will the World Awaken from Its Slumbers?

Will I be able to help awaken the world from its slumbers so that the world will finally: better learn of the fundamental physical principle, better use the Bessler principle, and not forget the principle?

Remediation of Radioactive Nuclear Materials

There should be a side benefit associated with using the Bessler principle in the case of dealing with radioactive nuclear materials. We can destroy or remediate radioactive nuclear waste materials by rapid rotations. It wouldn't need to be from rotations about horizontal axes but I think that using the Bessler principle by rotations about horizontal axes would make remediation more effective than using rotations about vertical axes, especially if there are good lattice connections. People can do experiments to see whether rotations about horizontal or vertical axes are more effective in the remediation of radioactive nuclear wastes. People can do experiments to see what frequencies are more effective in the remediation of radioactive nuclear wastes. See ***GWU*** pp. 204-210 section "Devices to Reduce Radioactivity" of "8.1 Devices Dependent upon Bessler Principle" for more discussion.

Sun Puzzle Was Broken into Two Puzzles

Using history as a guide, I broke the sun puzzle into two separate puzzles, as has been done previously: (6) Sun Energy Puzzle and (9) Solar Corona Mystery. I thought it was instructive to leave them for separate consideration as two problems. With neither problem historically being fully considered, the historic false solution of one and the non-solution for the other would allow their situations to be more easily ignored or not subject to greater scrutiny. They were and are actually part of the same complete puzzle with the same common solution of the Bessler principle. My hat is off to any reader who noticed that ahead of time, without having previously been told of it say from my prior discussions found in section 4.4 "Sun

Power" on pp. 81-84 of ***GWU*** and in sub-section "Solar Corona Explained" on pp. 85-86 within section 5.1 "Atmospheric or Orbital Phenomena" of ***GWU***.

Complete Sun Puzzle Solved

The complete sun puzzle does have a common solution. Somewhat-deeper dark sunspots are cooler than the 6000° Kelvin photosphere. The furthest edges of the solar atmosphere have some mysterious radiations with their temperatures reaching 10 million degrees Kelvin. As elevations on the sun increase from the somewhat-deeper dark cooler-depths of the sunspots to the furthest edges of the solar atmosphere, there is a curiously great increase in the temperatures associated with the radiations coming from the sun. As the lie (even if unintentional) was repeated enough times, since the 1940s and 1950s very many people were led to believe that the sun obtained its energy from nuclear fusion reactions deep down inside the sun because no other solution appeared to be remotely possible. The rise in temperatures with elevation is certainly contrary to the expected idea of lower temperatures with increased elevation, corresponding to greater exposure to the ultra-cold 3° Kelvin (-270.15° Celsius), background temperature of space. Many people amazingly didn't notice that glaring trend, since the enigma was historically broken up sufficiently into two separate puzzles so that the separate though consistent temperature trends could be more easily ignored. Both puzzles/enigmas had common problems of temperatures increasing while elevation increased. Upon combining the enigmas into the complete sun puzzle, the Bessler principle easily provides a common solution to the total/combined enigma (combining 6 and 9), with the temperatures of the radiation properly increasing with elevation, as there is less interference from rotations of nuclei about somewhat horizontal axes. The cooler sunspots also always occur at the locations of strong vertical magnetic fields, which prohibit nuclei from rotating about horizontal axes. The nuclei there can only rotate about vertical axes so that they can acquire very little energy production from the Bessler principle. It was not a coincidence that the sunspots always occurred at locations of cooler matter relative to the photosphere. Any supposedly great heat coming out of the center of the sun didn't just happen to bypass the cooler locations of the sunspots. The sunspots were cooler because they were the locations of strong vertical magnetic fields prohibiting production of energy from the Bessler principle, so that we could see (like a window) through the energy productive solar atmosphere or photosphere into the cooler or non-energy-productive regions below the photosphere.

Non-problem of Missing Solar Neutrinos. The historic problem (found above in the section, "Properly Resolves Riddle of Missing Solar Neutrinos", at the end of the solution section "6~ Explanation for Sun Energy"), of there not being enough solar neutrinos for a hot fusion explanation for the sun, wouldn't even have come up, if it had been properly understood that hot fusion was not a viable explanation in the first place. That historic problem (was also mentioned in ***GWU*** on p. 84 in the paragraph, "Properly Resolves Riddle of Missing Solar Neutrinos", at the end of the section "4.4 Sun Power").

Sun Eternal Power Source? The sun may be considered as nearly an eternal source of light/energy/power, since the sun has almost nothing to do with obtaining energy from any sort of nuclear reactions. The sun may produce power almost eternally or at least some huge number of times longer than prior estimates poorly based according to power production supposedly coming purely from nuclear reactions. A hypothetical star made of just helium could find that helium nuclei at the furthest edges of its atmosphere could be rotationally ripped apart into four lighter nuclei of two protons and two neutrons (with the neutrons decaying into protons, electrons, etc.) by the Bessler principle, which principle can cause extremely rapid rotations about horizontal axes at such locations with very little interference from other nuclei.

Further Puzzle Commonalities

The solution to the combined (6) Sun Energy Puzzle and the (9) Solar Corona Mystery, have qualitatively similar solutions to the (8) Earth Temperature Puzzle and the (13) Jupiter-Saturn Excess-Radiation Puzzles. This should not now be surprising, since they all have the common root solution using the Bessler principle applied to their atmospheres. Did you notice the commonality before I pointed it out? If so, you should be congratulated. I suppose I might have given a slight clue about puzzle commonality by my lumping the separate enigmas of Jupiter and Saturn into a single enigma number 13. I suppose that I also left another clue about puzzle commonality by indicating that there were increases in temperature as elevation increased in puzzles 6, 9, and 13. I suppose that I could have withheld that information for puzzles 6 and 13. That might have made it a little more difficult to see commonalities in the solutions.

Dichotomies of Precision

There is often a dichotomy of many ordinary approximations relative to the ultra-fine precisions associated with Bessler principle related things. Many engineering and scientific ideas reasonably come from a viewpoint of just getting things done quickly to sufficient precision. Whether one tries to get a Papp engine to properly work or one tries to get a cold fusion experiment to succeed, there is often a level of precision or quality of detail that can be beyond the grasp of the person just trying to muddle their way through things, according to approximate-standard rules or especially according to incorrect rules. If they don't understand why success is possible, then the experimenters/inventors may ignore important details allowing the experiments/inventions to succeed. There is especially a great contrast between planned obsolescence and the highest quality associated with the very-long-lasting, large-load-supporting, and very-low-friction Orffyrean-roller-bearings. Finest quality is the name of the game and I think that Bessler emphasized it in his chiastic little-book puzzle. In Bessler's little book according to p. 225 of ***PM97*** Collins' translation, "the qualities of the elements are necessary to keep things going." The phrase has multiple meanings. Also, see nearby comments on p. 523 of ***GWU***. It is hoped that more people will come along, who are sufficiently careful, knowledgeable, and precise so that they can carry out further pioneering rotational-energy efforts, which will allow more of the Bessler-principle

related successes to go forth. The dichotomies of precision easily spill over to dichotomies of goals/priorities.

Example of Hot Fusion Misplaced Priorities. The nuclear reactions experimenters were going in completely the wrong direction, regarding production of energy, during the attempts of closing holes in magnetic bottles during confined hot fusion experiments using horizontal magnetic fields. They couldn't understand why they had any "holes" in their magnetic bottles. The larger the holes in the magnetic bottles actually meant that there were greater angular speeds of the internally rotating nuclei as produced by the Bessler principle creating counter magnetic fields or holes in the magnetic confinement bottles of "hot fusion" experiments. They should have tried to increase energy production by the Bessler principle of more rapidly rotating nuclei rather than to try to close the holes in the magnetic bottles in their misguided attempts to produce hot fusion within the bottles. They had blinders covering their eyes, since they had exactly the wrong goal or priority, of creating hot fusion, and they didn't seem to have the foggiest belief in a Bessler principle affecting the tiniest of rotations of nuclei. They could never see that they were actually increasing the energy production by means of the Bessler principle accidently, when they increased the leakage current "holes" out of their magnetic bottles. See pp. 210-215 of ***GWU***. The ultra-fine precision of the rotational motion of the nuclei (creating magnetic bottle leakage currents) was totally ignored during the comparisons with the more "visible" translational motions of nuclei. They should have encouraged/allowed more nuclei to rotate about horizontal axes (without much external interference) to produce more energy by the Bessler principle rather than trying to tame all the slithering plasma "snakes". They should have used much smaller translational temperatures and greater internal-rotational temperatures so that the rotating nuclei not magnetically interfere much with other rotating nuclei having large magnetic dipoles. The hot fusion experimenters were trying to produce energy, according to how they incorrectly imagined that energy was being produced within the sun. Their goals were completely counter to the only realistic means that would have provided true success, which energy production success would have given them great relative energy output somewhat similar to how it was actually done in the photosphere of the sun but at lower temperatures so as not to be destructive to their equipment. They would have had success without the problems of producing undesirable radioactivity. If they could have only understood so, they would have learned that those pesky problematic holes in their magnetic bottles contained the seeds to the real solution to the actual problem of their producing great amounts of energy similar to how it is done on the sun. To have had success, they would have needed to go against the most basic portions of the ingrained yet incomplete training that they had received so far.

Artificial Suns

Given that situation of dichotomies of precision, I am thinking that we could produce artificial suns, using horizontal magnetic fields and just Papp gas (say f = 1.46, with no oxygen). The Papp gas formula was by volume (.5*f^5H_2, f^4He, f^3Ne,

f^2Ar, fKr, Xe)(100%)/(.5*f^5+f^4+f^3+f^2+f+1). We could use gas that is initially cool and at low pressure so that there is not a great amount of interaction between the nuclei. Near any point where nuclei acquire extra angular speed from the Bessler principle, the molecules of hydrogen are separated into two hydrogen atoms. If after waiting for some nuclei to acquire extra angular speed there are not large photons, then that means that the nuclei are not isolated enough, even when sometimes being in a constant horizontal magnetic field. If the photons are too large, then more gas should be slowly inserted to increase the interactions of the magnetic dipoles, to produce many more photons, which are less energetic. If temperatures increase enough, the rotational moderation might be done by magnetic dipole interference as is mostly done in our sun's photosphere. As suggested in Fig. 19 below (as viewed from above), strong-permanent C-shaped magnets could supply horizontal magnetic fields so that there might not be any steady cost for using current to produce the horizontal magnetic fields. The magnet should to be aligned with the surrounding earth's magnetic field to provide the largest-strength nearly-horizontal magnetic-fields. See Fig. 7 for a detailed view of a rotating nucleus within horizontal magnetic fields (either as viewed from above or as viewed from the front). If there is too much interaction, then lower pressures could be used but it is hard to recover gas already released. Why am I suggesting the use of only Papp gas? The magnetic moments in the hydrogen nuclei (meaning protons, which initially just have nuclear magnetic moments) align with the horizontal magnetic fields and allow for increases of the angular speed about horizontal axes by the Bessler principle. The noble gases could serve to moderate the artificial sun and to help ensure it doesn't become a runaway situation. In case there is a potential runaway situation, as indicated by a rumbling sound, the magnet might be quickly removed or better yet quickly turned so that the horizontal magnetic fields would then be vertical. When proper conditions are found, heat or light generated could be absorbed by dark surrounding containers of water to generate steam. If not starting with one atmosphere, you could start with a small fraction of an atmosphere of Papp gas, with a vertical magnetic field before slowly rotating to a horizontal magnetic field. If after a sufficiently long wait with a horizontal magnetic field, when photons are too few and too energetic, then the pressure can be increased by slowly adding more Papp gas then waiting to hopefully produce many more photons or radiation, which are less energetic. That would be to emulate the photosphere instead of the solar corona. We may not be able to emulate that solar corona due to lack of isolation of nuclei but emulation of the solar corona is less important than the partial emulation of the photosphere. To reduce production of photons and energy of photons, the C-shaped magnet could be turned so that the magnetic fields are less horizontal, causing rotating nuclei to be less energetically productive, according to the Bessler principle. To avoid a runaway situation you might turn the C-shaped magnet so that its fields are vertical and if need be release the Papp gas (or expose the gas to outside air) to completely start over. I suppose that carefully following the experimental results, for chosen values

of f, should provide artificial suns without any radioactivity problems. We can try different values of f to see which does best in producing an artificial sun.

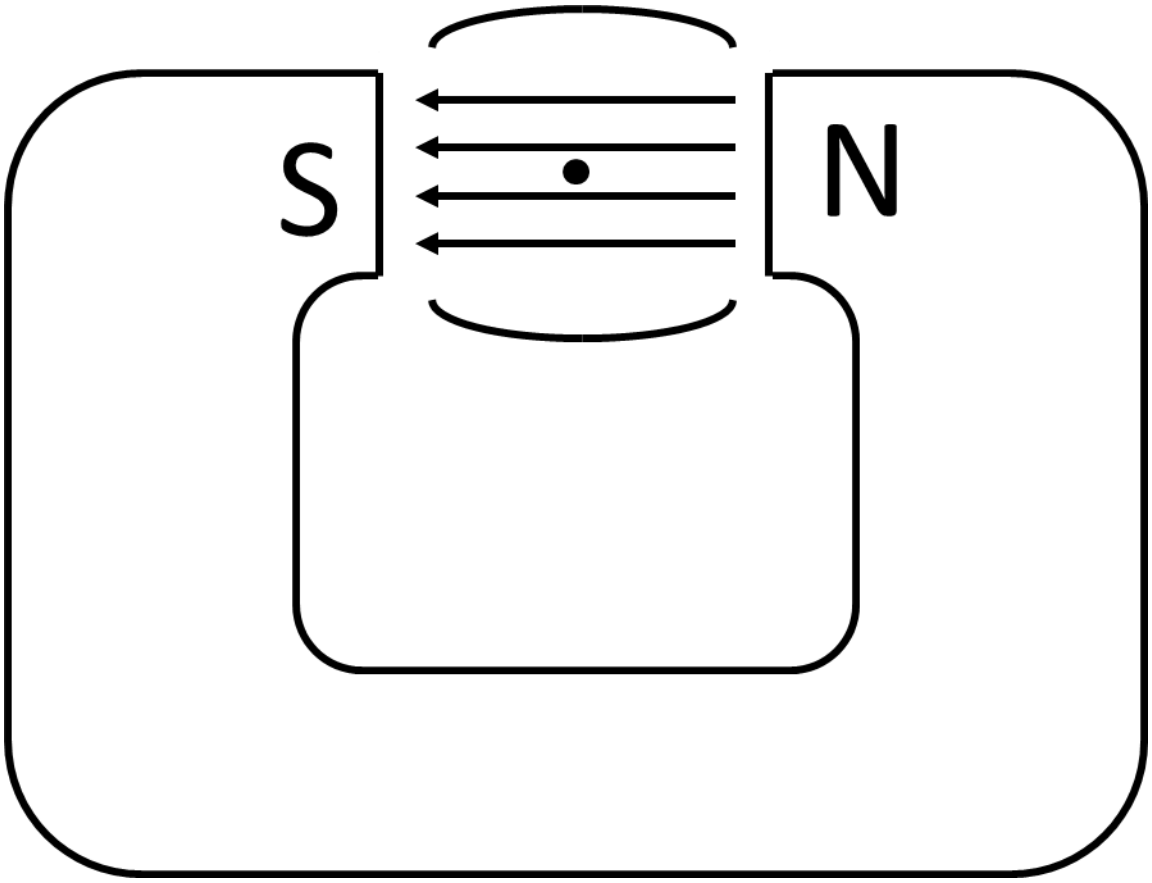


Fig. 19. An artificial sun is produced using horizontal magnetic fields.

Pure Hydrogen for Very Large f. As another thought, using a Papp gas of f being very large (meaning pure hydrogen) as roughly on the sun, then at a higher temperature, with the magnetic dipoles interfering with each other and sometimes being in regions of horizontal magnetic fields, the process might at the "right" pressure be sustainable to keep producing power by the Bessler principle. Again, the rotational moderation might be done by magnetic dipole interference as is mostly done in our sun's photosphere. With pure hydrogen, a lower temperature situation might be initially created where there is very little interference with the protons being magnetically held in place slightly. For a low enough initial temperature and at a "proper" pressure, a horizontal magnetic field might create some tenuous strings of hydrogen atoms. Within a tenuous string, nearby hydrogen atoms would be attractive because of their nuclear magnetic moments (or magnetic dipoles) but repulsive when the electrons of the atoms are very close. There might be little or no interference within such tenuous strings so that the Bessler principle could allow very rapidly rotating nuclei to be created, which could cause energetic photons to be produced. Unfortunately moving hydrogen atoms might easily come

into and leave such tenuous strings. If some of the hydrogen atoms cannot be somewhat held in place in such tenuous strings, then we might not expect much energy production by the Bessler principle. Would the magnetic fields be able to hold some hydrogen atoms translationally stationary at the N or S pole edges of the magnet, to form some nearly stationary atoms there having magnetic dipoles? One could look to a slightly similar situation with the GEET reactor, where the central rod's south magnetic pole received many attracted magnetic dipoles, which increased the strength of the magnetic poles of the central rod enough so that it could float. There could be even more N or S pole edges for strings to lodge upon, if desired, by introducing connected ferromagnetic sheets (parallel to the magnet surfaces), with gaps between them. Attitude could be used for rotational moderation so that the sheets not become too hot and heat could be carried away by infrared radiation. Using a large pressure of one atmosphere might reduce the energy of the photons down to the infrared region and avoid experimental complications associated with lower pressures. Though we might expect the counter magnetic fields of isolated dipoles to decrease the field of the magnet, according to Fig. 7 or the prior pesky magnet holes, the magnetic dipoles lodging themselves on the surface of the magnetic poles of the magnet could actually increase the field strength of the magnet. The results would depend upon experimentation. Lack of rotational moderation can increase power production but that could increase safety problems. I suspect that using pure hydrogen with the possibility of forming some partial magnetic strings, with magnetic dipoles becoming attached to the magnet surfaces, might be the most promising approach. If the dipoles attach to the pole surfaces and strengthen the magnetic fields, then non-ferromagnetic mechanical braces on the corners could be inserted between the poles so that the C-shaped magnets are not broken by the additional magnetic stresses.

Hydrogen and Helium for an f of 6. Still, here is another approach to form an artificial sun. I think that there is some rotational moderation from helium on our sun. An f of 6 might be more like our sun, if in the photosphere we were to have 25% He by mass and 75% H by mass, meaning there are 75/(25/4) = 12 H nuclei for each He nucleus, since the helium nucleus has four times the mass of the hydrogen nucleus. The f formula counts hydrogen molecules so f = 6 = 12/2 when ignoring the other noble gas components. We can use whatever value of f that works safely and we can even ignore mixtures with the heavier noble gas components, if it provides better/faster results. Such a formula, ignoring heavier noble gas components, would be by volume or number of molecules (.5*f H_2, He)(100%)/(.5*f+1). As with the other approaches, we would need to do the experiments to best determine how an artificial sun slightly like the sun's photosphere might be practically and safely emulated. The presence of more helium atoms may make tenuous magnetic strings less effective, since the helium nuclei need to acquire angular speed before they acquire magnetic moments thus making any tenuous magnetic strings less uniform. Non-uniformity may not matter much, if it is the hydrogen atoms that primarily attach themselves to the surfaces of the magnet poles and if the hydrogen atoms are more effective than the rotating helium atoms. Having a large pressure of one

atmosphere might reduce experimental complications and make sure that the energies of photons are not too large.

Practical and Safe Emulation. We might need to cut back on energy production in experimental prototypes, since an actual 6000° Kelvin artificial sun would destroy nearby experimental equipment. After getting results from initial studies where we can easily change the attitude of some magnetic fields, we might want to work toward using the earth's magnetic fields, with gas pressures large enough to sustain production of reduced temperatures. Locations of horizontal magnetic fields on the earth's magnetic equator might need larger pressures with more rotational moderation by more noble gas, having lower values of f. I would suppose that such approaches without supplying extra magnetic fields (such as using C-shaped magnets) would not be viable, since we can somewhat see their effect in natural gas deposits located near the magnetic equator. Natural gas contains many hydrogen atoms.

What If Unsuccessful? Now if the maximum power densities produced are too small (as I suspect will be the case for unattached atoms), it may be because gravity on the earth is so much smaller than in the sun's photosphere, the photosphere is hundreds of kilometers thick allowing photons to be obtained over an immense volume, and it is difficult to provide strong horizontal magnetic fields to large volumes. I can see hope from magnetic dipoles attached near surfaces of poles of magnets, from larger pressures of one atmosphere not available in the low pressure photosphere, and the horizontal magnetic fields not available within the photosphere. If power densities are not large enough, we might take some tips from the Papp engines to increase the power densities. We could just go with the Papp engines for producing enough power, assuming we don't want to deal with energetic explosions of Papp gas. We could irradiate Papp gas with either high frequency sparks or RF radiation but not so much to produce an explosion, as occurred with Papp when a non-chemical explosion destroyed his engine in 1968. Even if the power from the artificial suns is not commercially viable for power production, there should be enough photons produced to provide evidence for the Bessler principle. A sustained heat source without any fuel consumptions could have commercial applications (say for wintertime applications) even if not large enough power to run engines. During the summertime or hot times, the heating can be essentially turned off by turning the devices so that their magnetic fields are vertical.

I liked best the discussion from the prior paragraph "Pure Hydrogen for Very Large f" for producing an artificial sun.

Greenhouse Effect Cover-up

I wonder how long it will take the world to realize that much of the earth atmosphere warming effects that were given a label of the greenhouse effect really are due to the Bessler principle. It was sort of a cover-up for the ignorance of many people. Was that infrared radiation coming back from the atmosphere actually due to re-radiation of converted radiation or did it mainly originate from the Bessler principle, with nuclei in "greenhouse" and other gases rapidly rotating about horizontal axes? Many people could not imagine an alternative to the greenhouse

effect. I am not saying that there is not a greenhouse effect, since I think that there is such an effect. I am just questioning how much of the heating is properly due to the greenhouse effect and how much is properly due to the Bessler principle.

Experimental Measurements. During laboratory measurements of the greenhouse effect, the scientists have not separated out energy production, which was properly due to the Bessler principle. If a scientist shines light on a gas enclosed in glass, then this can encourage some molecules to rotate about horizontal axes, which encourages their nuclei to rotate more about horizontal axes and acquire energy from the Bessler principle. If the experimenters measured the total power before, during, and after the radiation, then this would better show what is really going on. The experimenters should not just simply assume that since energy is conserved, then any radiation produced is due to the greenhouse effect. They should properly subtract any excess energy produced before simply assuming that all new radiation produced is due to the greenhouse effect. That determines the total energies associated with both processes. Then the challenge comes of properly associating the amounts of particular frequencies with the processes that produced them. The scientists must be much more careful in their experiments and analyses. I think that by not being meticulous, they have deprived themselves of observing one more enigma violating conservation of energy. The proper accounting for the excess energy produced would have its actual solution based upon the Bessler principle. I am not saying that it is an easy thing to do those complete energy studies (over all frequencies) but that is what really needs to be done, if they don't want to pay homage to conservation of energy. It was and is much easier to just "go with the flow" and assume conservation of energy. Still, to be honest, we need to properly consider the Bessler principle in our studies, since energy is actually produced, when nuclei rotate about horizontal axes.

Better Models and Simulations. I think at some point, when we include the dominant heating effect for the earth coming from the Bessler principle (according to better measurements) and we have improved our dynamic predictive models, then we will better understand what is really what. I don't see how theoretical simulations (regarding weather, climate, planets, mechanics, turbulence, etc.) can have a chance of being correct, if they continue to exclude a crucially important fundamental-physical-principle (namely Bessler's principle). Climate simulations for the earth should not be believed, if they continue to exclude the dominant heating effect for the earth. If prior simulations contained heuristics based upon or projected from actual measurements, then the simulations may have been unknowingly partly correct. I suspect that the Bessler principle, which is the dominant heating source for both this solar system and this earth, will eventually emerge as the dominant explanation for the infrared radiation currently labelled incorrectly as being re-radiated from the atmosphere by "greenhouse" gases.

Reduce Greenhouse Gases. There is a balance, between the earth becoming frozen by the ultra-cold background of space and the earth becoming too hot, associated with the nonlinear Bessler principle producing much heat and slightly associated with the greenhouse gases retaining some energy. The Bessler principle

also produces more heating within the earth at the equator where the earth's angular velocity is horizontal than at the poles where the earth's angular velocity is vertical. Because of the Bessler principle and observed trends, I think, to be good stewards of our environment, we now might reasonably do what we can to reduce the production of pollutants of so-called greenhouse gases in our earth's atmosphere. We must not go overboard on the reduction, since water vapor is one of those greenhouse gases. We can do much without regulatory constraints but we first need to put on our thinking caps. I said that the Bessler principle is nonlinear, since it is so, but when comparing any hot fusion explanations for multitudes of stars with a simple Bessler principle solution, the Bessler principle solution is quite stable allowing a wide variety of nearly-perpetual stars. Though Jupiter and Saturn are not stars, since they don't have enough mass, they do show that massive bodies with atmospheres can produce excess heat despite the ultra-cold 3° Kelvin background of space. Great excess heat is produced whether or not the atmospheres are "greenhouse" gases.

Possible New Reason to Reduce Greenhouse Gases and Other Polluting Things. Though flawed, if the standard analyses were correct (which they are not) about the amount of absorption of radiation by greenhouse gases, then the production of new radiation/heating by new or extra greenhouse gases, molecules, atoms, nuclei, particles, and droplets in the atmosphere using the Bessler principle might constitute additional sources of rotational production of heat in the atmosphere for the earth beyond that heating due to greenhouse gases. Those "additional" heating sources could then provide another separate argument for the importance of reduction of extra "greenhouse gases", molecules, atoms, nuclei, particles, and droplets, by not trying to put such extra polluting things into the atmosphere in the first place and/or by removing them from the atmosphere, if it is reasonably possible.

Don't Double Count Problems. We must not double count our problems. The problem of extra heat from the Bessler principle must not be added to the prior misunderstood heating from greenhouse gases, when I think that almost all the prior greenhouse gas "problems" were actually due to the Bessler principle. We must be very careful with our analyses.

Recognize Cooling from Extra Gases. The addition of some extra things in the atmosphere in some cases can cause more mutual interference, which could reduce heating by the Bessler principle, which would effectively produce relative cooling. Again, we must be very careful with our analyses.

We shouldn't Fear Using Fossil Fuels. I am not against our using fossil fuels. We should not fear CO_2 in the atmosphere any more than we would fear H_2O in the atmosphere, since both are "greenhouse" gases and both help plants to grow. Water is needed for plant growth and carbon dioxide behaves as better than a fertilizer for plant growth, since CO_2 is a requirement for plant growth. If we are concerned about burning fossil fuels, have we compared the pollutions of fossil fuel use with the release by mismanaged destruction of modern fuels without reason, such as raging wildfires destroying many thousands of acres of forests?

Use Fossil Fuels until Too Costly. Using fossil fuels needs to remain until we can pragmatically show that we can generate more 24-7 (24 hours per day, seven days per week) green-energy by the Bessler principle with less cost than with burning fossil fuels. When it is too costly to burn fossil fuels, then market force will begin to eliminate their burning.

Transitions to Green 24-7 Energy

The transition(s) should ideally not be imposed by regulations and government subsidies. The transition should ideally come about by itself according to market conditions as the Bessler principle technologies advance. The market should automatically show which new technologies can provide the most total usable energy for the least total cost.

Pioneering Developments/Redevelopments of Green 24-7 Energy. Seed money for the development or redevelopment might come from investors wanting to obtain large future profits or from governments seeing great downstream benefits by taking the pioneering efforts that individuals/groups consider to be too difficult or risky. I am mainly thinking of the redevelopment or reinvention of: the Papp engines, the Sweet Sixteen family of cylinders, and the Orffyrean roller bearings. We should not forget the GEET reactors which have previously been developed but need greater use as we redevelop the other purer Bessler principle devices, which should greatly lower energy costs beyond the lower costs from using GEET reactors. I think that the GEET reactors are currently greatly underused and I think can be made green 24-7 nearly-closed-cycles, if the proper steps are taken. We should also consider the perpetual motion devices or magnetic motors patented by Yildiz, if they can be shown to produce energy with sufficient economy. I am thinking that greater education about the Bessler-principle energy situation coupled with some modest Bessler-principle pioneering developments by private investors will begin to replace the great suppression by powerful vested self-interests. Internal capitalization of development efforts by powerful vested self-interests might be advised so that they not be left behind, when a flood of green 24-7 energy solutions begins to break forth.

Avoid Green New Deal. We should not advocate any green new deal devices where the energy collection times, to pay back the energy to produce the devices, is too large. We should not advocate regulations or subsidies to switch from fossil fuel use to expensive-intermittent "green" solar power and wind power. Only market pressures should be used for switching to such "green" options. We must not encourage an unsustainable energy economy. The energy payback times are too long for electricity produced by collection of solar energy and wind energy. I think that there are effective blights or problems associated with "green" new deal systems including: damage to the environment/wildlife, extra insurance costs against potential damage to roofs, costs of decommissioning, pollution from outdated systems, hidden costs of government subsidies, hidden maintenance costs, and duplicate energy production systems (required by intermittent energy production).

Extract Pollutants

With a rotational energy revolution coming with very inexpensive 24-7 green-energy, we could extract many pollutants from the atmosphere during our search for other valuable commodities. If we capture the pollutants during our searches, we could save or use some of them and possibly find markets for the sale of such. Having some of these things available may allow others to find useful purposes for them. If we can't find uses for the pollutants, we could use ultra-inexpensive energy to refashion the pollutants into useful things. Extracting pollutants might be a spin-off from trying to capture "noble" gases.

Obtain and Save "Noble" Gases. I suggest that the valuable noble gases should be sequestered for use in Papp engines and not released into the atmosphere by such frivolous/wasteful activities as putting them into balloons, which may slowly deflate or quickly pop. I am not saying that we should stop giving out birthday balloons but do we fully comprehend how important the resources actually are? Maybe we won't understand until we see many Papp engines working and occasionally needing to be refilled with initially expensive reusable "fuel" sources of the "noble" gases. The Papp engines need to have their reservoirs occasionally refilled, since over time the gases slowly leak out of the Papp engines into the atmosphere. The increased demand for the "noble" gases for use in Papp engines should cause their prices to initially increase. The price paid for inflating a birthday balloon should also rise dramatically, when the value of the gas used is better understood. By means of cooling using plentiful energy from say Papp engines, I think that we can obtain from our atmosphere additional sources of "noble" gases needed for Papp engines. The noble gases might be "plucked off" or separated from other gases using temperatures above and below their boiling points, as the temperatures are reduced. Extracting noble gases using ultra-low energy costs would increase their supplies which would tend to cause their costs to fall. The next paragraph is a method we could use. You may want to skip the next two paragraphs, if you are not interested in such technical details.

Separation of Noble Gases from the Atmosphere. We could remove particular gas types when they liquefy at low enough temperatures. If they first form a solid by sublimation (CO_2), then we might need to remove them say by repeated cooling, screening, and heating so as hopefully to not contaminate liquid forms of other gases with sublimed CO_2 contaminating crystals. Non-noble gas types could be removed as liquids when they are cooled to low enough temperatures. Using page numbers from ***CRC*** showing boiling points of gases to separate out gases, we could cool down a selected portion of gas from our atmosphere to almost -61.8°C for Rn or radon p. D-142 to remove any contaminant gases (being particularly careful to first exclude any nearby -60.7°C for H_2S or hydrogen sulfide p. B-95 that might be there) then cooling just below radon's boiling point to attempt to obtain it in liquid form. We actually don't need to bother looking for radon, since the isotope with the longest lifetime is ${}_{86}Rn^{222}$, which has a lifetime of 3.823 days p. B-497. The gas radon wasn't part of the Papp gas formulas. Next, we could cool down the remaining gas to almost -107.1°C for Xe or xenon p. D-142 to remove any

contaminant gases (being aware of the sublimation problem near -78.5°C for CO_2 or carbon dioxide p. B-80) then cooling just below xenon's boiling point to obtain it in liquid form. Next, we could cool down the remaining gas to almost -152.30°C for Kr or krypton p. D-142 to remove any contaminant gases (such as nearby -151.8°C for NO or nitrogen oxide p. B-115 and more easily removed OF_2 or oxygen difluoride with boiling point of -144.8°C seen on p. B-91) then cooling just below krypton's boiling point to obtain it in liquid form. Next, we could cool down the remaining gas to almost -185.7°C for Ar or argon p. D-142 to remove any contaminant gases (such as -183.0°C for O_2 or oxygen p. B-116) then cooling just below argon's boiling point to obtain it in liquid form. Then, we could cool down the remaining gas to almost -245.92°C for Ne or neon p. D-142 to remove any contaminant gases (such as -188.14°C for F or fluorine p. B-91, -191.5°C for CO or carbon monoxide p. B-80, and -195.8°C for N_2 or nitrogen p. B-115) then cooling just below neon's boiling point to obtain it in liquid form and hopefully any remaining gas should have boiling points of -252.5°C for H_2 or hydrogen p. D-142 and -268.6°C for He or helium p. D-142. We would need to cool down to a little below the boiling point of hydrogen to separate it out in liquid form. The remaining gas should be helium. The most recent/correct values for the boiling points, at the actually used pressures, may need to be used to best separate out the "noble" gases from other contaminant gases in the atmosphere.

Another Noble Gas Extraction Method. With the exception of the subliming CO_2, I suppose that the separation process might instead be done in reverse order, since it might be easier to extract gases than to extract liquids. Some gas from our atmosphere could be cooled down to a temperature between the boiling point of hydrogen and helium. The remaining helium gas could be extracted. As the mixture is slowly warmed the desired gases could be simply extracted just above the appropriate boiling point temperatures. It would require more cooling to cool down larger amounts of gas but that might be of less importance in an era of very inexpensive energy. I think that without cause we should not waste the energy we have so that the energy may be used for other things. I don't know what method would be easiest to implement and I don't know what method would provide the greatest purity of the gases. The gas extraction process might be used in conjunction with other processes to avoid wasting energy. We could combine the two methods going down then up in temperature, one as a pre-sorter and the other as a final sorter of the presorted things.

Some Implications of Rotational Energy Revolution

Rotational Energy Revolution. With enterprising individuals reinventing such special things as (1) the Papp engines, (2) the Sweet Sixteen family of cylinders, and (3) the Orffyrean roller bearings, I think that a great rotational-energy-revolution will fully begin. I think that the revolution has begun conceptually and in various practical applications (such as with the railroads and the GEET reactors) but having significant engineering successes in any or all of those special devices would mark a greater practical beginning of the rotational-

energy-revolution. Those who bring forth the rotational energy revolution should be rewarded with great prosperity.

Great Prosperity

The revolution should create great prosperity, productivity, wealth, resources, new industries, and job opportunities, which have never been seen before on this earth. I think that pollution and emission of carbon dioxide should also be greatly suppressed by the rotational-energy-revolution. I think given smart robots and much energy available for collecting, sorting, and processing, one person's junk could become valuable resources for other people to nearly freely extract. Trash and waste could be valuable sources of hydrocarbons needed for various industries. I think that it would be best, with respect to disruptions of economies, that the rotational-energy-revolution is not imposed by regulations/funding by governments, though regulations should allow the work to go forward. The rotational-energy-revolution should best be self-initiated, though collaborations and seed-money should speed up successes, when the benefits of the new rotational-energy devices have been fully demonstrated or fully understood. The old technologies should be allowed to gradually dwindle on their own, without sudden market disruptions. The old technologies should also be allowed to gradually team-up with new technologies so as not to quickly disrupt products and services.

Very Inexpensive Energy Production. We need to consider the effect of at least one of the above three special solutions (Papp engines, Sweet Sixteen family of cylinders, and Orffyrean roller bearings) causing very inexpensive future-energy-production. Especially those three previously "proven" solutions but potentially other well-studied Bessler-principle solutions should be quite inexpensive (in the long run) for sustained 24-7 "green" energy production, since there are no hydrocarbon fuel costs with respect to one time burning of fuel. Truly inexpensive new methods for continual green future-power-production would automatically help (without any government assistance required) a myriad of concerns. Examples of such concerns include: food production, pure water production, movement of water, transportation, cost of resources, new industries using continual inexpensive energy production, many new jobs using new energy technologies, and pollution control. With inexpensive pure water production from sea water, many deserts (such as the Sahara) may be transformed into (or back into) vast regions for production of food, lumber, etc. Some underground fresh water wells and aquifers may be revived. Prior accumulated ground salts caused by much prior irrigation can be removed from the soil. Nutrients blocked by dams can be distributed, with the options of removing unnecessary/harmful dams. We can also reclaim soil that was washed out to sea or is being washed out to sea. Some valuable minerals might be reclaimed from the ocean depths, unless it is environmentally disruptive to do so. Mines should have greater yields. Any unwanted molten slag from mining could be used to produce Bessler principle cylinders used for energy production. Asiatic inland seas which had dried up could be restored where desired. With water being purified from the Black Sea, to say restore the Aral Sea, it might help to clean up the Black Sea so that the sea is not so black. Various chemicals could be extracted from the

black waters. If desired, many more lakes and farms could be constructed in the Gobi Desert, in the Australian deserts, in the Kalahari Desert, in the Sahara, in the American Great Basin, in the Atacama Desert, and in Saudi Arabia. The ocean levels should slightly drop because of such activities. When we realize that there is more than enough food, we should realize that there is no need to slash-and-burn our jungles, which provide many useful things of unique value. Besides many jungles being protected, many people should realize that there are easier ways to produce much more food. As we work to protect our jungles and oceans, there will be greater benefits for our atmosphere along with the flora, fauna, and sea life, which reside within such habitats. It might not be wise to completely destroy some desert habitats so as not to destroy desert plants and animals, which depend upon the desert.

Continual Energy Production

The Bessler-principle energy-production solutions would provide continual power solutions. There would be no disruptions due to fuel supply chain problems. There would be no disruptions due to lack of wind or the freezing up of bearings. The Orffyrean roller bearings use no lubricants so thus are not subject to freezing up under the coldest of conditions. There would be no disruptions due to lack of sunlight. Collecting energy from solar radiation and wind are intermittent secondary/tertiary energy sources which energy originally came from the primary continual power production from the Bessler principle as obtained on the sun. Should we not seek primary power sources that can be continually available by directly using the Bessler principle? We could well use any 24-7 artificial sun types of power sources.

Energy Not Conserved. There are all sorts of energy non-conservative things going on all around us, though we may not notice them. The whole idea of a Bessler principle is clearly energy non-conservative. Some people may loudly complain that the Bessler principle violates conservation of energy. All the solutions to the 15 stated enigmas required in part energy not being conserved. It should not be surprising that the enigmas required energy non-conservative solutions, which were centered on the Bessler principle. If all of the most fundamental processes are discrete and energy non-conservative, then the wonder actually should be that, on a macroscopic scale, energy-conservative formalisms could have been propped up for so long in this very discrete world. If all so-called forces are actually predicated upon discrete transfer of energy (by absorbing discrete electric fields), then there really are no contiguous forces and there are certainly no contiguous potential energies. What we call potential energies are more precisely due to absorptions of other discrete fields. No forces would ever be energy conservative. The so-called energy conservative gravity, when examined close enough, has discrete absorptions of two-part gravitons, with each graviton composed of two-discrete electric fields. Even the so-called energy conservative electric fields, when examined closely, have discrete absorptions of electric fields in an energy non-conservative manner. The magnetic fields are manifestations of the discrete electric fields coming in straight lines from moving finest most fundamental charges. Within the Papp engines, the

large number of reflections of photons (each photon composed of many discrete electric fields) allowed great multiples of the outward momentum of the photons to be extracted by the pistons. Was the momentum "macroscopically" transferred in an energy non-conservative manner? Even if macroscopically somewhat energy conservative, there are other cases where energy is not conserved beyond those provided by the Bessler principle, which are discussed in ***GWU***.

Truth versus Falsehoods

Repeated Lies. There are many lies, which if repeated enough times are believed by many people. I mentioned above the lie that the sun obtains its energy from hot fusion (see the first paragraph in section "Complete Sun Puzzle Solved" within "Will the World Awaken from Its Slumbers?" and see the prior commonplace incorrect assumption in paragraph "Does Sun Get Energy from Hot Fusion?" within "6 Sun Energy Puzzle"). There was the oft repeated lie that perpetual motion devices are impossible. Bessler should have destroyed that lie in the early 1700's but he and his wheels were suppressed. The definition of what constituted a perpetual motion device was changed so that a perpetual motion device must have a source of energy/power so that a perpetual motion device without a source of energy/power was impossible by definition. That curiously now, with knowledge of the Bessler principle, made the perpetual motion devices of Bessler correct, since they actually did have an energy/power source of energetic gravity. But then the "scientists" would not acknowledge such heresy. In response to the persistent evidence of Bessler's perpetually rotating wheels and their suppression, science forgot them and warped itself around the oft repeated lies that energy is always conserved and forces are always energy conservative. I think we are slowly beginning to learn the truth that the discrete forces are never energy conservative. Only upon ignoring rotations and averaging of discrete details did the ideas of conservation of energy seem to arise. By "science/scientists", through some curious quirks related to friction, somehow withholding or not mentioning many ideas of rotating "wheels" providing energy (by many experiments not being done to sufficient accuracy), we have effectively been lied to for a long time in many areas.

Truth Suppressed for Long Time. It would appear, from all the above solutions to enigmas coming forth, that much important physical truth has somehow been withheld from the people for a very long time. The truth did not come forth at the time of Bessler's wheels, during the early 1700s. The truth about the fundamental physical principle did not come forth in the 1800s or 1900s. There are indications that the truth, with respect to the Bessler principle, has been somehow suppressed much longer than the last three centuries. One might consider such things as the origin of the yin-yang principle/symbol, the roots of the stone mason principle, and cases of stones perpetually shining in darkness. Such things were touched upon in my 2019 book, ***GWU***.

I think that the message is the most important energy news of our time but the message has long been and has continued to be suppressed in many ways. I tried to provide compact evidence from a variety of perspectives, which cannot be easily denied.

Why Is News Suppressed? Why would such a globally-important far-reaching news-story neither generally be well reported nor directly be investigated much by more experiments/tests? Some possible reasons for the suppression of the story of the Bessler principle are given in ***Gravity-Wheel Unveiled*** (***GWU***) pp. 3, 25, 30-31, 110, 345, 348-349, 352, 354, 359, 370, 375, 377, 417, 432, 572, 617, and 669. Though the Bessler principle is self-suppressing by its invocation conditions and though there has been much prior suppression coming from people insisting that mass-energy must always be conserved, I think that the most fundamental and long-term reason for the great suppression is that the Bessler principle speaks in many ways of things of God. Though it might not be clear to us today, it was quite clear to Bessler, according to his writings about his devilish enemies who were attacking him because of his wheel. The suppression/confusion/contention over the centuries does not come from God. Consider 1 Corinthians 14:33, Proverbs 13:10, and 3 Nephi 11:29. The truth about the Bessler principle goes squarely against the well-established false-education about our physical world and seemingly goes against popularly established means for the production of power. Also, some of the most directly convincing experiments about the Bessler principle are usually the most difficult to do because we are usually surrounded by so much friction or rather physical contention.

Truth Suppression Yields Error. When truth does not go forth for whatever reason, it yields associated ignorance and error, with respect to those things related to that truth. When we make our decisions based upon ignorance and error, we tend to make poor decisions. Many poor decisions have been made for a very long time.

Truth Needs to Go Forth. When the truth does go forth, we tend to make better decisions. Better decisions are of much benefit to the people of this world. We should endeavor to do all that we can so that truth can go forth, regarding important fundamental physical principles.

Truth Will Prevail. In the long run, I think that such important truth will prevail or be triumphant. No matter how hard some people will try to suppress or hide or cover up important truth, such truth will eventually go forth. I think that knowledge of the Bessler principle will prevail.

Whatever Happened to the Experimental Method?

Galileo Galilei basically said to do experiments and see what happens. Is the idea of conservation of energy so powerful that it causes any experiment to test the Bessler principle not to be done, since we already know that energy must be conserved (so the Bessler principle can't be valid)? There would be no need to test out an idea potentially violating conservation of energy, if we have total confidence that energy is always conserved according to the perfectly known/understood law of physics. Here are some example tests of the Bessler principle, which really need to be done despite the well-established "law" of conservation of energy.

Change Attitude of Counter-flow Vortex Tube

One of the simplest experiments to do is to orient a counter-flow vortex tube in a vertical attitude (whether hot end is up or down) to see if the hot minus cold

temperature difference is much smaller than the difference for the tube in a horizontal attitude. If that is observed, then it would be evidence in favor of the Bessler principle. The experiment should best be done, when the sun and moon are aligned vertically so that gravity is primarily vertical. The experiment should be repeated for the other vertical attitude (that is hot and cold ends switch places) to see if there is continued evidence for the Bessler principle.

Test Magnetic Motor of Muammer Yildiz

Start a magnetic motor of Muammer Yildiz and have it continually run a fan. Record how long it can run a fan. A clock and day counter could be provided to show how long it has run so far. If it can power a fan for more than a day, then this would provide evidence for the Bessler principle. If it provides continual power for longer than 54 days, then that would be longer than the 54 day test of Bessler's wheel within a locked and sealed room. Bessler's 54 day test or nearly eight-week test had an intermediate inspection stop (see pp. 93, 96-97, 101, and 122 of ***PM97***), though Bessler didn't want the test to stop at 54 days. On p. 101 of ***PM97*** it said, "Karl felt that the point had been made; if eight weeks was not sufficient length of time to prove that the wheel was not wound up or driven by external sources, how many weeks would be acceptable?" These tests of the perpetual motion devices of Yildiz would show much greater evidence for the Bessler principle.

Rotate Cylinder in Space

We should go into space and rotate a rotationally new cylinder at extremely low friction about its horizontal rotational axis of symmetry to see if the cylinder increases in angular speed. If that is observed, then it would be evidence in favor of the Bessler principle. Horizontal would be with respect to the earth, the sun, and the moon, which are hopefully in a plane perpendicular to the cylinder's rotational axis of symmetry, with that experiment hopefully being done approximately in that plane.

Is Experiment Forbidden? I was wondering, if somehow such a test or experiment is somehow forbidden. Could it be a forbidden experiment because based on conservation of energy it cannot possibly increase in rotational kinetic energy? If the result is so obvious, shouldn't any such "forbidden" experiment be done anyway just to show that energy is conserved and to prove that there is no Bessler principle operating of the cylinder? It seems to me that the subject is too important to just ignore and never do the test.

Astronaut Could Do Experiment. Couldn't an astronaut carry a marked coin or better yet as suggested by Fig. 20 a short-cylindrical-like pencil into space and try to do the experiment? A pencil could be marked with a visible line drawn along an edge from near its point to its eraser end. Video of the experiment should clearly show whether or not there is an increase in the angular speed of such a rotating pencil. A pencil both better shows the rotational axis and has less air friction (per unit of mass) than a larger radius coin. Hopefully the pencil was not previously rotated very rapidly. If the pencil increases in its angular speed toward equilibrium with the frictional forces, then that is further evidence for the Bessler principle.

Fig. 20. Rotate a smooth round-surface pencil in space about a horizontal axis of rotational symmetry.

Replicate Small Version of McKinley Lower Friction Demonstration

We should test out a small-scale lower-cost version of the McKinley low friction demonstration. A small version would use less liquid helium so it would cost less than a full-scale version. A less-massive rotationally-new axle should be associated with either a tiny external wheel or no external wheel. A rotationally-new axle extending beyond the cold confines would with care allow for rotations to be observed. A tiny external wheel would not provide sufficient friction at higher angular speeds to guarantee safety. For the sake of safety, manual friction should be supplied well before the axle begins to rotate too rapidly. If the axle or small wheel is observed to increase in angular speed, then it would be evidence in favor of the Bessler principle.

Train Tests

We should increase either the mass per wheel-axle or the number of wheel-axles for each rail car and see if that increases the miles per gallon of fuel for transporting a ton of freight by rail car. If that is observed, then it would be evidence in favor of the Bessler principle. The tests need to be done for comparable speed conditions, for comparable shapes of rail cars (comparable air friction), for comparable bearings, and for the same type of new metal in wheel-axles.

Truck Tests

Increase axle mass on truck axles to see if that increases miles per gallon of fuel. If that is observed it would be evidence in favor of the Bessler principle. The tests need to be done for comparable speed conditions, for the same load sizes, for the same air pressure in tires, for comparable shapes of trucks (comparable air friction), for comparable bearings, and for the same type of new axle metal.

Car Tests

Increase axle mass on car axles to see if that increases miles per gallon of fuel. If that is observed, then it would be evidence in favor of the Bessler principle. The tests need to be done for the same speed conditions, for the same load sizes, for the same air pressure in tires, for the same shapes of cars (same air friction), for comparable bearings, and for the same type of new axle metal.

Leveraging Using Rotating Cylinders for Energy Production

Consider again pulling blocks up the sides of pyramids in subsection “Ideas for Rolling Normal Blocks up Pyramid Faces” of section “Principle Was Known in Ancient Egypt” by using leveraging while rotating massive cylinders about horizontal axes, with good axles/bearings. It is dangerous to test for the rolling of the massive blocks up the sides of the pyramid faces but we can test for part of the power source, when rotating massive cylinders about stationary axles using leveraging. We should test to see if by using such leveraging while rotating massive

cylinders about horizontal axes, with low friction axles/bearings, we would use less total expended energy to lift a mass "M" up a cliff for height "H" than the theoretical computed potential energy MgH, where "g" is the acceleration due to gravity. If the leveraging using massive rotating cylinders about horizontal axes has a lower energy cost than MgH, then that would be evidence in favor of the Bessler principle. See Fig. 21 for an experiment but remember that the Egyptians would have had even more energy savings, since they would be rolling their blocks (located within cylinders) up a smooth incline, with extra energy provided by the Bessler principle, rather than just lifting the mass M straight up. Even if such an experiment could neither have been calculated millennia ago nor currently easily calculated, with available low-friction bearings/axles, nevertheless the experiments could have been qualitatively done long ago and currently to determine which method had lower "people-burdens" multiplied by the time to do the lifting of the masses M up heights of H. For example, if a task of repetitively lifting a mass of M up a height of H (while leveraging using rotationally-new massive rotating cylinders, with low air friction) could have been done by fewer people in the same time compared to doing the tasks using a rope to pull on a pulley having nearly zero mass (which energy should be approximately MgH, according to the usual theory), then that anciently or currently would have been evidence in favor of the Bessler principle.

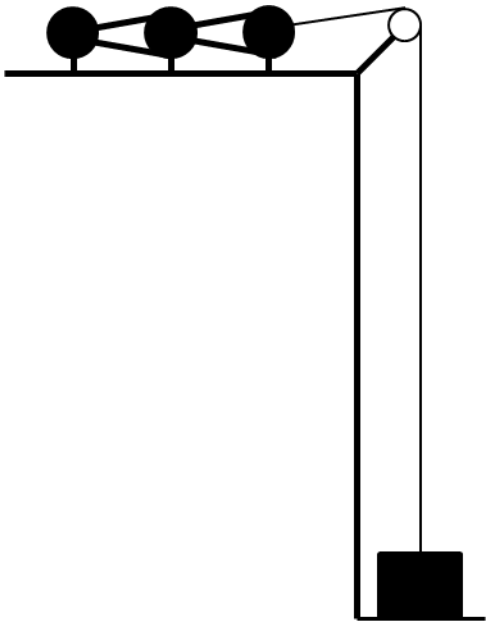


Fig. 21. Test for excess energy production during lifting mass M, while leveraging by rotating massive cylinders.

No Gravitational Potential Energy. Because of the Bessler principle, I suppose that the test will show that despite loses of energy due to friction the leveraging with massive cylinders will show that less energy will be needed to raise the mass M a height of H than MgH. This should destroy the physical notion of the gravitational potential energy, notwithstanding its usefulness in many cases where

the Bessler principle comes little into play. There is no actual gravitational potential energy field. A car coasting downhill is supplied kinetic energy from the downward pulls of discrete gravitons being absorbed. A car coasting uphill has its kinetic energy reduced by the downward pulls of discrete gravitons being absorbed. There is no actual conservation of energy in such processes, though it often simplifies many calculations to assume energy is conserved, when it doesn't involve masses rotating about horizontal axes. On a finest discrete level, energy is never conserved, whenever a discrete graviton or a discrete electric field is absorbed.

Hot Magnetic Spot Production in Dual Compartment Washing Machines

After considering subsections "Yin-yang Symbol" and "Washing Machines" of section "Principle Was Known among Ancient Chinese", someone should try to build a version of an ancient dual-compartment washing machine. If it were filled with water and rotated about a horizontal axis using an external power source, would hot spots appear at the end locations specified by the dots of the most anciently-available yin-yang symbol? See Fig. 17 for my best available view of one side with the other side being the mirror image. If so, then that would be evidence in favor of the Bessler principle. Without there being a Bessler principle, there would be no hot spots. If there were no Bessler principle, the molecules and nuclei at the spots would at most rotate with the angular speed of the washing machine but that would not cause extra energy to be produced there according to extra rotations produced there and those locations being the locations of least rotational restriction, because the spots in the interior are furthest from solid edges. But since I am sure that there really is a Bessler principle, then I am sure that extra rotations will be increasingly produced nearest the center of the spots and especially in the interior of the cylinder (where the water can most freely turn) so the tests should show graduated hot spots, with the highest temperatures at the center of those most anciently-specified locations. That there will be graduated hot spots and that their highest values appearing at the middles/centers of the locations according to the most ancient versions of the yin-yang symbol, then such would provide evidences that the Bessler principle is correct. Without there being a Bessler principle, there would be no hot spots of any kind (graduated or not), since there would be no extra rotations at the centers of the spots.

Magnetic Poles at Spots. The rapid rotations of molecules and nuclei about horizontal axes would cause each nucleus to be a strong magnetic dipole. Thus the water molecules would form line segments of the form HOH, which would join with other HOH water molecules to form long magnetic chains (HOHHOH, HOHHOHHOH, etc.). For the interior regions of the graduated spots, the magnetic chains would combine with other magnetic chains to form magnetic sheets and the sheets would form with other sheets to form magnetic volumes. Thus, especially at the spot interiors there would be measurable graduated magnetic poles toward the centers/middles of the spots located on the ends of the cylinders. The pole type would depend upon which way the rotation is being done and which end is being considered. Both the graduated spots on an end of a cylinder would have the same magnetic polarity. The graduated spots on the other end of the cylinder would have

the opposite magnetic polarity. The nuclei at the middle interior of the spots (half way between the cylinder ends) would especially acquire angular velocity in the same direction as the cylinder. Considering the middle portion of Fig. 7 of this ***MSEHNS*** (or Fig. 47 on p. 187 of ***GWU***), if the rotation of the cylinder is according to the angular velocity vector (**ω**), then the end of the cylinder on the same end as the arrow end of the angular velocity vector would correspond to the end with the north magnetic poles. Similar to the two earlier definitions in this ***MSEHNS*** and prior definitions on pp. 114, 185, and 212 of ***GWU***, the angular velocity vector points in the direction that a right-hand screw would travel, if the screw were so rotated in its screw hole. If magnetic poles are increasingly present at the centers of the spots and the polarities are the same as those predicted, then those things would be further evidence in favor of the Bessler principle. If there were not a Bessler principle, then there would be no magnetic poles observed at the locations of the hot spots.

GEET Studies

We should increase the percentage of water in a GEET reactor and see if that increases energy production. If that is observed, then it would be evidence in favor of the Bessler principle.

Other Explanations than Bessler Principle?

Given the results of those experimental tests, many other experimental tests needing to be done (both in ***GWU*** and in this ***MSEHNS***), and many observations of phenomena (both in ***GWU*** and in this ***MSEHNS***), can someone come up with simpler explanations for all the results/observations than the explanations using the Bessler principle?

Are You Trapped by Falsehood?

Are You Sleeping? Are you sleeping or dozing in a conservation-of-energy trap? I hope that this book has caused you to wake up, if you were asleep. Many sleepy people have figured that they knew the basic laws of science without more fully studying them. Without more fully doing the experiments at low enough friction, they have figured that rotating things about horizontal axes can never produce extra energy because it is a well-known proven fact demanded by science and the thoroughly-studied "Laws" of Physics. Supposedly total mass-energy and potential energy is always conserved within measurable bounds, except for the slight bounds according to the uncertainty principle of quantum mechanics. Did you fall into the conservation-of-energy trap?

Falsehood Trap Self-test. Though I hope that you now correctly understand the energy situation, here is a self-test containing some energy falsehoods, which you may have believed. In the following quote, how many of the sentences are true? "Since energy is always conserved, a perpetual motion device (producing its own power from gravity) can never exist and clearly no one has ever found or produced one. Any apparent exceptions by Johann Ernst Elias Bessler, Joseph Papp, and Muammer Yildiz (whether coming from hoax or fraud or fable or ignorance) must be rejected because total energy (meaning mass-energy) can't be increased within a gravity-powered mobile not receiving any external mechanical power source (for

examples, neither river driven nor falling water driven). The GEET reactor invention by Paul Pantone, which can produce more power in an engine using more stationary cool-water-vapor fuel, is impossible, because water can't burn. The vortex tubes from Ranque or Hilsch, which produce temperature differentials by swirling air about horizontal axes, within horizontal tubes, must be understood as proper well-observed phenomena, associated with well-studied turbulence, without any energy being produced. The repeated positive cold fusion experimental results are clear violations of the well-understood completely-correct laws of nuclear physics. Surely there must be experimental errors in any cold fusion experiment, which shows that for initially very-low kinetic-energy of the center of mass of each deuterium nucleus we somehow obtain nuclear-fusion, when two of such nuclei combine to form a helium nucleus. Since the sun produces its energy from nuclear reactions deep down within it, you must ignore as obviously incorrect any evidence of dark sunspot probes somewhat further down into the sun through its thick photosphere, because they always happen to be at fortuitous locations of cooler matter, as the evidence clearly indicates. It is not clear where the solar corona gets its very energetic photons but their great individual energies are provided, while overall mass-energy along with potential energy is conserved. Though the earth is nearly surrounded in all directions by the ultra-cold background temperature of space (3° Kelvin), we clearly don't freeze because of only the beneficial greenhouse effect, the decay of radioactive materials within the earth, the nuclear reactions within the earth, the residual pre-existing heat down within the earth, the tidal forces within the earth, and the great radiation from our hot sun. Coral Castle and the pyramids of Egypt were clearly built completely by brute strength, never violating the primary dictum of conservation of energy. The multitude of other so-called anomalies/enigmas must be ignored as incorrect in the name of the centerpiece, conservation-of-energy. The electric and gravitational fields both have infinite range, according to their respective perfectly-demonstrated versions of Gauss's law, with their fields never being shielded so that the conveyers of the forces are diluted to arbitrarily small amounts as their range increases sufficiently, since they are never absorbed."

Self-test Answers. Every sentence in the quoted self-test was false. None were true. I hope that you spotted the errors and that you extracted or will extract yourself from the mind-numbing conservation-of-energy trap. If you didn't pass the self-test by not being able to spot all the errors, then I suggest that you pay more careful attention to the evidences found in my writings/books and especially in related experimental/observed data. You are welcome to retake the self-test as many times as needed. If you disagree with any of my answers or anything else in this book, you may send me an email to my email account (AldenEugenePark AT gmail DOT com) or respond to one of my GETTR posts (@Alden_Park). My GETTR posts were each meant to be applicable for a long time.

Some Strange Implications of Bessler Principle

Strange Implications of Bessler Principle. If there really is a Bessler principle, as I am sure there is, then it has strange implications. One might reject

the strange implications purely because they sound strange but, with the preponderance of the evidence in favor of the Bessler principle, I think that it is extremely difficult to reject the Bessler principle because of the much data. The Bessler principle provides strong evidence that there are two separate discrete pulldowns by each graviton. There is more discussion in ***GWU***. Here are briefly some of the strange implications.

Future and Past Dependence. The earlier and later absorptions or pulldowns of each quantum graviton are strangely dependent on each other. If that were not so, then gravity would then be about twice as penetrating as an ordinary unpaired discrete electric field. Without dependence, one discrete electric field of a graviton could be readily absorbed and then the other discrete electric field could be readily absorbed. Thus the paired electric fields of a graviton would only have approximately twice the penetration distance of ordinary discrete, unpaired electric fields. But there really is a Bessler principle and gravity typically penetrates very much further than twice the distance of discrete, unpaired electric fields. The graviton won't be absorbed unless both parts of the graviton are absorbed. The earlier absorption knows that the later one will be absorbed and the later one knows that the earlier one was absorbed. This has strange implications of the future knowing things of the past and the past even stranger knowing things of the future. We live in a very special universe with the past and future being curiously dependent upon each other.

Matter/Gravity Has Intelligence. There would appear to be an innate intelligence in all matter (or gravitons, which are a very special form of light). Matter (or gravitons) can know the truth about the past (or rather have a direct memory of some of it) and matter (or gravitons) can directly know the truth about some of the future. Matter (or gravitons) can make present absorption decisions based on their knowledge of the past or their knowledge of the future. Some information effectively goes forward and other information effectively goes backward in time. There would seem to be a type of intelligence in the coordinated absorption decisions by gravity/matter using memory and foresight. I prefer to think of matter as having the intelligence, though I suppose the intelligence extends to the whole of the universe including all space and all forms of light.

New Type of Maxwell's Demon. The idea of a Bessler principle creates a new type of Maxwell's demon. Though not an intelligent being sensing translational speed of matter and then opening a trapdoor, to sort matter into faster and slower moving groups of particles, it is a much smaller, intelligent "being" with its information sensing operating at a much more local level. Matter effectively knows its own rotational energy state. The most rapidly rotating matter acquires the most angular speed, according to the Bessler principle. The least rotating matter acquires the least angular speed. That is how the new "demon" rotationally sorts out matter. The matter particles somewhat create their own rotational self-sorting of themselves into higher and lower rotational energy states, according to their prior rotational dispositions. With the appearance of the new type of Maxwell's demon many of our "cherished" ideas must be discarded. There is not a

conservation of angular momentum. We must discard the idea that energy is conserved.

Beyond the Bessler Principle

Explanations to 16 Enigmatic Phenomena/Issues beyond Bessler Principle. Because of the Bessler principle providing information about discrete gravity, there are explanations for other enigmatic phenomena/issues, which explanations only indirectly depend upon the Bessler principle. Such explanations often do not depend upon energy being conserved. Below I provide brief explanations to the following 16 phenomena or likely resolved issues: (1) the greater energy acquisition for large energy cosmic rays, (2) the size of the universe (***GWU*** pp. 289-290), (3) the shape of the universe (***GWU*** p. 383), (4) the age of the universe (***GWU*** p. 378), (5) the incorrectness of the Big Bang (***GWU*** pp. 292, 306, 344, and 378), (6) the justification of uniformity in the night sky (resolving the horizon problem) (***GWU*** pp. 378-379), (7) the future of the universe (***GWU*** p. 379), (8) the dark matter (***GWU*** pp. 291-314 and 381-383), (9) the dark energy (***GWU*** pp. 291-314 and 381-383), (10) the baryon asymmetry (meaning why there is so much matter rather than antimatter in the universe) (***GWU*** p. 381), (11) the nature of the three spatial dimensions (***GWU*** pp. 383-384), (12) the composition of the discrete gravitons (***GWU*** pp. 55, 292, 440, and 458), (13) the composition of photons (***GWU*** pp. 292, 344, and 463), (14) the composition of discrete electric fields (***GWU*** pp. 328, 357, and 458), (15) the hierarchy problem (meaning why gravity is so weak relative to the electric force) (***GWU*** p. 386), and (16) the likely lack of supermassive black holes in galactic centers (***GWU*** p. 309).

Comments Partly Resolving 19 Enigmatic Subjects. For other 19 partly resolved issues, with some possibly using the Bessler principle, see my comments in "15.6 Solutions to Prior Unsolved Problems" (pp. 377-415) of ***GWU*** concerning: (1) gravitational waves, (2) extra dimensions?, (3) locality, (4) magnetic monopoles?, (5) proton decay?, (6) origin of accretion disc jets, (7) gamma ray bursts, (8) supernovae, (9) origin of magnetar magnetic field, (10) space roar, (11) nuclei and nuclear astrophysics, (12) hydrogen atom, (13) turbulence, (14) entropy, (15) are there actually CP violations?, (16) parity conservation violation?, (17) quantum mechanics in the correspondence limit, (18) physical information, and (19) a discrete theory of everything.

Discrete Theory of Everything. Please consider my free book, ***GWU***, which includes an attempted discrete theory of everything (on its pp. 320-329, 412-415, and 458-469). That theory helps provide explanations for those additional enigmas, which have mainly gravity solutions beyond those solutions available by just using the Bessler principle. My discrete theory of everything was an attempt at a generalization of insights provided by knowledge of the Bessler principle.

Greater Energy for Cosmic Rays. Regarding the energy source for the cosmic rays (or very rapidly moving particles traveling out in space), we must discard the idea that linear momentum must be conserved. The linear momentum and energy of cosmic rays can increase, by more attractive gravitons being discretely absorbed in front of them than in their rear (***GWU*** pp. 280-291, 294-297,

312, 323, and 399). The cosmic rays are unbounded in energy as long as they don't run into something. They just keep increasing their kinetic energy. That explains the origin of the ultra-high-energy cosmic rays. The idea that there are energetically unbounded cosmic rays strongly suggests that the universe is unbounded in size. The idea of the universe being unbounded or infinite in size is consistent with the scriptures. The shape of the infinite universe is rather meaningless but one can loosely say that it has the shape of an infinite radius sphere or an infinite side cube. Both those meaningless infinite shapes contain the same infinite number of points.

Gravitons. All matter, in this infinite universe, continually emits energetic gravitons. Many of the gravitons travel extremely long distances until they are absorbed in matter. Each quantum graviton has two parts, according to the Bessler principle. Each graviton is composed of two discrete electric fields with those two discrete electric fields having come from finest most fundamental opposite charges or spirit matter of opposite charges. Each of the discrete electric fields in a graviton travels, until it is attractively absorbed by a finest most fundamental charge opposite the charge that it originally came from. The force of gravity is very weak relative to the electric force because the graviton of two discrete electric field parts acts as a single quantum unit, even though the graviton has $10 - 2 = 8$ extra formation and absorption constraint conditions beyond the electric force. See p. 65 of ***GWU***.

Light, Gravitons, Dark Matter, and Dark Energy. Each photon of light is a quantum collection of a large number of discrete electric fields traveling together in the same direction. Each discrete electric field is a "longitudinal" wave traveling in a straight line of temporarily appearing and disappearing finest most fundamental charges of one charge type. The charges themselves do not move, since only the waves have motion. I suspect that the finest most fundamental charges, which temporarily appear in the discrete electric field have the same charge type as the charge originating the discrete electric field. There is much light pulled down slightly by gravity in this infinite universe. Gravity attractively interacts with light. An energetic two-part graviton reasonably pulls attractively down on two discrete finest opposite charges temporarily appearing within light. The energetic graviton absorbed by the photon reasonably leaves behind two finest most fundamental opposite charges of new dark "invisible" matter and the charges remain behind or don't disappear after the photon passes by. That explains the origin of the dark matter. If each new charge comes along with its own new space (roughly maintaining balance between matter and space in the universe), then that would explain so called "dark energy". The dark energy means that discrete space keeps expanding forever, as new space is added in tiny bits. When there is a sufficiently large collection of the finest fundamental opposite charges or spirit matter, then the spirit matter in obedience to God condenses into an atom of hydrogen. That explains the rest of the origin of "new" stationary matter and the reason for the baryon asymmetry across this vast infinite universe. According to longstanding convention required by God, the obedient spirit matter doesn't

condense into antimatter. The new hydrogen "blocks/shields" (by interaction) many photons from coming to us from very far away. That mostly causes the night sky to be black, though there is also some extreme red shifting of greatly-receding extremely-far-away electromagnetic-energy-sources. The many hydrogen atoms out in space might be considered to be part of dark matter, since they make the night sky dark/black, but it would be simplest to just call the matter new or new matter. The new ultra-cold hydrogen atoms/molecules acquire some motion from the "blocked" or reflected or reemitted photons (sapping away photon energy by many encounters with hydrogen). On some occasions the hydrogen atoms/molecules are slowed down by photon encounters. It would be somewhat akin to Brownian motion of the particles. Hydrogen atoms/molecules could also strike other hydrogen atoms/molecules, which could influence the motion of the velocities and angular velocities of the molecules about their zeros. Even after hydrogen atoms/molecules are given more or less motion, the background temperature of space is very cold (3° Kelvin).

Infinite Everywhere-expanding Matter-increasing Universe. There are explanations using gravity for the above phenomena of energetic unbounded cosmic rays, new matter, and new space. Those explanations mean we live in an infinite everywhere-expanding matter-forever-increasing universe. That would not be possible, except for there being a God. That provides evidence that there is a God. God would be required to organize the galaxies and in turn providing much new light, new gravity, new matter, and new space. As a farmer well plants seeds and tends the plants, God would also be necessary to keep such an infinite everywhere-expanding everywhere-matter-increasing universe in balance on a truly infinite or cosmic scale. You can't keep an infinite everywhere-expanding everywhere-matter-increasing universe in balance without God. You can't exclusively form new matter over antimatter across an expanding infinite universe, without God or rather without obedient spirit matter being everywhere subject to God. The infinite-size-expanding steady-state-increasing universe implies that the universe has been infinitely old and will forever continue to be infinitely old, which age is consistent with the scriptures. God is "... without beginning of days or end of years; ..." (see Moses 1:3). There are many references in the scriptures to eternal life or everlasting life or life everlasting or life eternal. For example, see John 3:15-16, 5:39, 12:50, and 17:3. All these things make it clear why there is such uniformity in the night sky and why there was no Big Bang. There was no big bang at a finite time in the past.

Don't Assume Supermassive Black Holes in Galactic Centers. Some people seemed to automatically equate supermassive dark/black regions in galactic centers with "proof" that there are supermassive black holes in those galactic centers. They seemed to not consider any other possibilities. The simultaneous presence of much light and much gravity would cause much dark matter to be formed (***GWU*** p. 309). It is more reasonable to only conclude that there are supermassive dark/black regions within those galactic centers. As viewed from outside such galaxies, I think that there would be much obscuring matter blocking

starlight from the innermost stars but as viewed from within, there would be interior stars visible against a dark obscuring background. See my 20200618 (June 18, 2020) https://gravityunveiled.home.blog/ blog post and my 20210903 GETTR post (under @Alden_Park). Also, consider a case in point on p. 547 of ***GWU***. There is not a supermassive black hole within our galactic center but rather there are many great stars slowly rotating about their galactic center wherein near/at the very center is a greatest star or great light, according to the scriptures in Abraham 3:2-4, 13, and 16. One might think that many great stars slowly rotating together about their galactic center would be a vast unstable equilibrium situation but with God keeping everything in balance it could be a vast synergistic source for the great production of new light, new gravity, new matter, and new space. In hindsight, there appears to be great genius of God somehow keeping close to each other the great production centers of gravity and light so that they can work together to produce much new matter and space.

Special Graviton

Do we have sufficient faith that we can see the meanings of the physical symbols that we are being given by nature? I think that each graviton, from its beginning to its end, provides symbolic evidence that there is a God. With each bit of matter providing many continual sources of gravitons, there is great symbolic evidence for God in nature, as we will now consider.

Graviton Has a Special "Life". The remarkably rare special graviton: (1) has an extremely unlikely quantum "birth" from two finest-most-fundamental matter-parents of opposite spirit charges, (2) lives out its mortal "life" by following its straightest path, and (3) "dies" by total-intelligent-quantum self-sacrifice of both its discrete electric-field parts. Upon its total self-sacrificial death of both its parts, it may bring finest most-fundamental-matter closer to it, or it may cause finest most-fundamental-matter to turn more relative to it, or it may cause temporary finest most-fundamental-matter children of light to come forth and then to remain in new eternal states of living matter in their own new spaces. Each new eternal state of matter in eternity becomes a future-spirit-matter-parent for helping to produce an unbounded number of gravitons and from them unbounded numbers of finest most-fundamental spirit-matter-descendants, with such processes continuing forever.

Special Graviton Symbols. The special graviton provides everywhere abundant symbols in nature of Jesus Christ. See Moses 6:63, which says, "... all things are created and made to bear record of me ..." Also see Alma 30:44, which says, "... all things denote there is a God ..." See 3 Nephi 9:15, which says, "... I am Jesus Christ the Son of God. I created the heavens and the earth, and all things that in them are. ..." Also see Colossians 1:16, which says, "For by him were all things created, that are in heaven, and that are in earth, visible and invisible, ... all things were created by him, and for him:" Also see Mormon 9:11, which says, "... it is that same God who created the heavens and the earth, and all things that in them are." Also see 2 Nephi 2:14, which says, "... for there is a God, and he hath created all things, both the heavens and the earth, and all things that in them are,

both things to act and things to be acted upon." Also see Mosiah 4:2, which says, "... we believe in Jesus Christ, the Son of God, who created heaven and earth, and all things ..."

All Things Denote Jesus Christ. Since all things denote Jesus Christ, hopefully as you consider/reconsider these things regarding the special graviton you will see things that denote Jesus Christ. The special symbolic two-part graviton begins with an extremely unlikely "birth", follows its perfectly straight line, and eventually "dies" by an intelligent two-part total-self-sacrificial death. In the two-part pull-down process, it may cause matter to come unto it or it may cause matter to turn more unto it according to its prior turning unto it or it may cause new eternal spirit-matter-children to come forth of light providing new perpetual sources of new gravitons to come forth forever.

Abrahamic Covenant Parallels. Though imperfect, I noticed some micro-parallels to the Abrahamic covenant. (1) With finest-most-fundamental oppositely-charged-matter-pairs (spirit matter) being obedient to God, (2) they in eternity would have spirit matter seed without number; (3) vast eternal matter, lands, and space would be produced for them; (4) through their "posterity/relatives" all spirit matter "families" would receive similar opportunities; (5) the special graviton would be one of their "descendants". See (1) Genesis 17:1, Genesis 22:18; see (2) Genesis 17:2, Genesis 22:17; see (3) Genesis 12:7, Genesis 13:15, Genesis 17:8; see (4) Genesis 12:3, Genesis 22:18; see (5) Genesis 3:15, Genesis 12:3, Genesis 49:10, 2 Samuel 7:12-16, Matthew 1, Luke 3:23-38, Galatians 3, Moses 4:21.

More Solutions

A Few More Solutions to Scientific Enigmas. I couldn't resist providing a few more solutions to scientific enigmas. See Appendix A "Some More Solutions" for a few more solutions to scientific enigmas. I added twelve more solutions. It might only be 12 - 2 = 10 more solutions, since A.11 was previously counted and A.10 might not be consider to be a solution to an enigma even though it could be considered as a solution to an important problem. You should not think that I am providing exhaustive lists of solutions. With a fundamental physical principle and ubiquitous gravity, we would expect many more solutions to scientific enigmas associated with rotations of matter about horizontal axes, as we notice the enigmas. Because of frequent interrelationships of many things, there may be some difficulty in the counting of enigmas and their solutions, so any counting of them should be considered as approximate. I didn't list water clusters as a separate solution, since I didn't think it was a recognized enigma. I did discuss them, within my "Appendix A.3 Partial Explanation for a Working Stanley Meyer Fuel Cell" (of this book ***MSEHNS***) within which I discussed their formation somewhat in paragraph, "Stagnant Water Inhibits Rotational Ripping Apart of Water". I didn't list climbing of water in a tree as a separate solution, since I didn't know if it was considered as an enigma, but in my "Appendix A.4 Reasons Why Electrons Effectively Lost from Earth's Surface to Atmosphere" (of this book ***MSEHNS***) I mentioned "Extra energy for transporting water up could be provided by water molecule chains rolling up the

insides of xylem cells using the Bessler principle ..." within paragraph, "Second Reason for Earth Effectively Losing Electrons".

Bessler and Bernoulli Principles

Bessler Principle Helps Wing Lift from Bernoulli Principle. Even though it may not be an enigma, I thought that I would make some comments on the Bernoulli principle given knowledge of the Bessler principle. When air runs into and above a wing, we understand that the air travels faster going up and over than the straight air flow below. See the drawing of a wing cross-section on the front cover below the title. It is commonly said that the air flows faster above, since it has further to go to maintain the streamline. The faster flow above creates reduced pressure above or lift, according to the Bernoulli principle. I think that the Bessler principle sheds some light on the situation. When air hits the front edge of a wing it can cause air molecules and atoms to rotate about horizontal axes while the molecules and atoms are deflected upward. The rotations of the molecules and atoms cause the nuclei within to rotate more rapidly about horizontal axes. The Bessler principle causes the rotating nuclei to rotate even more rapidly about horizontal axes. This causes the molecules and atoms to rotate even more rapidly about horizontal axes. As the molecules and atoms interact with the top surface of the wing, that cause the molecules and atoms to go faster translationally. Then, as before, the faster-air-flow on top creates lift, according to the Bernoulli principle.

Test with and without Bessler Principle. We can test out the situation in a horizontal wind tunnel using horizontal and then vertical portions of wings. The normal horizontal wings/airfoil, with horizontal wind, would have the benefit of the Bessler principle because of rotations about horizontal axes. The vertical wings/airfoil (as if the plane had rolled over 90 degrees either to the left or to the right) would create rotations of molecules, atoms, and nuclei about vertical axes so they would not have much benefit from the Bessler principle. Would there be the same pressure drops? I suspect not. Relative to the normal horizontal wings, I suspect that the vertical wings would not have as much of a drop in pressure for the longer pathway, because it doesn't have the benefit of the Bessler principle. People can do the measurements to see if that is the case. If it were known that there was a pressure difference, then some people might have considered that to be an enigma or puzzle.

Summary

Many Scientific Enigmas Solved Despite Suppression. In this book, I solved many scientific enigmas. There has been much suppression of stories of scientific enigmas along with their solutions. Some enigmas should have been reported millennia ago but were not well reported and thus not solved until more recently. Then three centuries ago, some enigmas (related to Bessler's wheels, such as snowflake formation and the sun's energy source) should have come to light, with solutions. Such enigmas did not come to light because of denial and biased suppression, causing the "scientific" world to "paint itself into an energy nonproductive corner". The scientific world would have needed to do many actual experiments regarding the subjects, which it did not do. When experiments were

done the analyses were often partial or not thorough enough. During the last century, many more enigmas have come forth but they and their solutions were suppressed and associated experiments were typically not done. I have been trying to bring forth many scientifically-enigmatic stories with my solutions (and many associated experiments, in ***GWU*** and this ***MSEHNS***) but the prior stories from many people and places have usually been met with great suppression/bias, of various types. Some manifestations of enigmas have been ignored or ridiculed or considered as unscientific by prejudiced/skeptical people. The truth will in time go forth to the world despite hundreds of years of "scientific dogma" suppressing the stories and their solutions. I have been battling against the "scientific imperative" that mass-energy (incorporating calculation-efficient-yet-artificial potential-energies) is always conserved. Because mass-energy is not always conserved there are many enigmas existing outside the scope of prevailing "science", thus prohibiting proper solutions in the eyes of the well-entrenched “scientific” mafia. I will continue to battle against many truth-suppressing “scientists” of this world, until either they do their scientific duty by their doing rotational energy experiments required of them or they cast their eyes about and actually admit to the many rotational energy evidences that are before their very eyes. Hopefully they will begin to embrace the truth of the Bessler principle. Hopefully the previously skeptical scientists will not continue to strongly and erringly advocate that energy is always conserved. The “scientists” who deny the experimental method can only deny or hide from the truth for so long, until eventually the truth catches up with them.

Eighty-nine New Solutions to Enigmas. I think that I can resolve at least 89 = 15 + 27 + 2 + 16 + 19 + 10 scientifically enigmatic subjects, including the idea that the sun obtains its energy non-conservatively from the Bessler principle. For those subjects, I either provided explanations/solutions or brief explanations/solutions or references to my explaining comments. For anyone who until recently did not accept as correct my discrete theory of everything or its prototypical example of the Bessler principle with related ideas/principles, then to them many of my explanations/solutions might now be new. For them many scientific enigmas will now have new solutions.

Solution References for the Eighty-nine Enigmas. For the 15 enigmas with their solutions, see the 15 forming the main chiasm of this book or see the paragraph “Bessler Principle Solved All Those 15 Enigmas”. The rest, of the references to the enigmas having solutions (27 + 2 + 16 + 19 + 10), are in the “AFTERWORD” main section. For the 27, see within section, “Principle Solves Many More Enigmas”, the paragraph, “Bessler Principle Solves 27 More Enigmas”. Then for the two enigmas, I counted section “Principle Was Known in Ancient Egypt” (since I figured there was a puzzle/enigma about how the Egyptians heroically moved the blocks to the pyramids and especially up the pyramids) and I counted section “Principle Was Known among Ancient Chinese” (since I think it was a far-reaching puzzle/enigma about the origin of the yin-yang physical symbol and especially its oldest versions) but I didn't count section “Olmecs Rolled Massive

Stone-pre-heads" (since I guessed that there was not much of an puzzle/enigma concerning how they moved the 20 ton monuments). To me, the rolling solution seemed to be rather obvious. For the 16, see within the section, "Beyond the Bessler Principle", the paragraph, "Explanations to 16 Enigmatic Phenomena/Issues beyond Bessler Principle". Just after that paragraph, for the 19, see the paragraph, "Comments Partly Resolving 19 Enigmatic Subjects". For the 10, see the paragraph, "A Few More Solutions to Scientific Enigmas" referring to Appendix A "Some More Solutions.

Benefits of Green 24-7 Energy Solutions. For the sake of fairness and having a level "playing field", I do not support any greatly-subsidized Green New Deal; yet I am trying to encourage several green 24-7 energy solutions, which in the long run will provide extremely low-cost energy. The green 24-7 energy solutions need to pay for themselves. Using reinvention information, which I provided, I think that those green 24-7 energy solutions will happen, after for example any of the following three especially-advocated perpetual-motion-related devices are reinvented: the Papp engines, the Sweet Sixteen family of cylinders, and the Orffyrean roller bearings. Two of those three methods needing to be reinvented were available after I decoded the little coded books, which books were written by the inventors. The decoding "key" in each case was simply the "hidden" Bessler principle, which key of the principle would surely have been eventually available to people for decoding, when people finally became aware of the knowledge of the fundamental physical principle. Using the key of the Bessler principle, I filled in the missing reinvention details of the third method or the Papp engine invention, which reinvention details were missing in the patents.

GEET Reactors. People can also currently make much better use of the existing GEET reactors, which depend upon the Bessler principle. It can be made to approach close to a green 24-7 energy solution, with some fuel assistance and when much cool water is available.

Other Green 24-7 Energy Solutions. The existing perpetual motion devices powered by energetic gravity, of the Yildiz magnetic motors, should be considered for commercial production of energy. The Yildiz devices are powered by energetic two-part gravitons according to the Bessler principle, using very-special low-friction magnetic bearings. As I advocate those five devices and various other devices which should be coming forth, I am promoting a rotational energy revolution of very low cost energy, using the Bessler principle, with short energy payback times partly because they have green 24-7 energy solutions. I believe that there have been many other devices, which were somehow "shelved". An example of such a device, which was somehow shelved was the fuel cell by Meyer. I think I supplied reinvention information for the Meyer fuel cell in my Appendix (A.3 Partial Explanation for a Working Stanley Meyer Fuel Cell) of this book ***MSEHNS***, which reinvention information I supplied curtesy of the Bessler principle. I would hope that someone uses the information that I supplied so as to reinvent the Meyer fuel cell, thus becoming yet another candidate for perpetual motion or another green 24-7 energy solution. The shelved devices were usually not shelved because they didn't work

well enough. In some cases their patents were bought by rich entities, prior to their being shelved. I don't think that patents can be bought up on those three especially-advocated devices nor on the Stanley Meyer patents. No one would try to buy up a patent that is beyond its expiration date, which I understand is 15 to 20 years of patent protection. Bessler and Leedskalnin long ago published how their devices were constructed in coded fashion, whereupon I decoded and published decoded solutions using the fundamental-physical-principle decoding-key of their Bessler/ED.L. principle. Papp partially patented his engine and I think I published the missing details, which he left out, by my using the fundamental-physical-principle decoding-key of the Bessler/ED.L. principle. Those pursuing controlled nuclear fusion might have obtained green 24-7 artificial suns without any radioactivity problems, if they switched their focus completely away from nuclear fusion and towards producing the greatest enhancement of those problematic/pesky leakage currents, previously somehow or rather mysteriously reducing the magnetic bottle confinement in the presence of horizontal magnetic fields. Such a change in focus would have made great use the Bessler principle, which is how the sun actually obtains its power, mainly within its photosphere. Producing such artificial suns would have been yet other routes for very-low-cost rotational energy production. The experimenters would have just needed to allow the rotating nuclei to acquire large angular speeds in the presence of horizontal magnetic fields by means of the Bessler principle. The rotational energy revolution has many important implications for the economical production of useful energy on this earth, with greatly beneficial implications. People can follow my instructions for producing artificial suns, which devices might be still more examples of possible green 24-7 energy-productive-devices. See "Artificial Suns" within "Dichotomies of Precision" within section "Will the World Awaken from Its Slumbers?" I figure that the best path for producing a practical artificial sun delivering infrared radiation (that is heat) would be to provide one atmosphere of hydrogen between the magnetic poles of a strong C-shaped magnet, with horizontal magnetic fields, so that magnetic dipoles of hydrogen (as the protons are rapidly rotated by the Bessler principle) can attach themselves to the surfaces of the magnet's magnetic poles. The attached magnetic dipoles would increase the field strength of the magnet, as occurred in the GEET reactors. Because there is to be much attaching of the magnetic dipoles attracted to magnetic pole locations rather than hanging out in open locations, the magnetic fields are increased rather than decreased, thus avoiding the much magnetic-bottle weakening-problems stumbled upon by the fusion researchers. Because of the greater magnetic field strength of the magnet, it could be reinforced by non-ferromagnetic materials so as not to break the C-shaped magnet. More energy productive sites for attaching magnetic dipoles should be provided by inserting well-supported extra ferromagnetic surfaces parallel to and between the magnetic poles, with hydrogen gas in the gaps between the extra surfaces (but not so much to weaken the magnetic fields). Power production can be switched off by rotating the C-shaped magnet so that its magnetic fields are vertical.

Currently Favor Reinventing Papp Engines. The Papp engines use external stimulation so I favor them for the most likely candidate for the next green 24-7 energy-productive-device, upon following my instructions. The Meyer fuel cell (after following my instructions) would be useful as another demonstration for rotationally ripping apart water molecules but the GEET reactors can already break apart water molecules for cool water vapor. The Sweet Sixteen family of cylinders, with its rules for energy production and with its need for massive new cylinders, may need to wait until after the reinvention of the Orffyrean roller bearing but it doesn't need to wait. Leedskalnin made the perpetual motion device work using ordinary roller bearings capable of rotating massive cylinders. The reinvention of the Orffyrean roller bearings may be less important in its allowing of much energy production by the Bessler principle in a world with much energy, than in its simultaneously producing a mechanical revolution that the earth has not seen before. Bessler spoke of such possibilities of a great 'Treatise on Mechanics' or 'Maschinen Tractate'. See ***PM97*** pp. 141-142, 173, 179, and 191. My second favorite candidate for the next green 24-7 energy-productive-device would be the relatively-simple artificial sun using one atmosphere of hydrogen and a C-shaped magnet, with many magnetic dipoles attaching themselves to the surfaces of magnetic poles and introduced ferromagnetic surfaces.

Overcome Conservation of Energy Deadlock. I am trying to overcome the deadlock regarding the conservation of energy by advocating the widespread utility of the energy-productive Bessler principle, using overwhelming evidence for the principle from many viewpoints. I think that proper practical and theoretical education/understanding is the key to the solving of many Bessler principle related enigmas. We just need to put on our "thinking caps" to be successful with the rotational energy revolution producing possibly a great variety of green 24-7 energy-productive-devices, which in the long run would provide production of very-low-cost energy.

The Bessler Principle. The Bessler principle was the key to understanding the solutions to many enigmas. We need to think carefully about and cleave to the truth, wherever it is found. I have provided many experiments, which could be carried out by people who are desirous to learn the truth about the Bessler principle. A part of the Bessler principle is the idea or sub-principle that there are two discrete or attractive impulses associated with each graviton. Associated with ED.L., which is Leedskalnin's version of the Bessler principle, is the idea or sub-principle that any wheel rotating too rapidly about a horizontal axis will destroy the lattice connections with the contained nuclei. We need to learn the bounds of what it means to be rotationally new. We need to do the experiments, which I have advocated regarding the utility of the Bessler principle, and be brave enough to report the results.

Use Bessler Principle. Eventually people will understand that there is a Bessler principle and they will begin to understand that by using it to produce energy ever more efficiently, then they will begin to understand that they can with increasing efficiency produce 24-7 green energy ever more efficiently. There are no

bounds on the energy production of Bessler principles devices. Any new or similar Bessler-principle devices (producing energy from gravity, such as Papp engines, GEET reactors, Bessler wheels, Yildiz motors, artificial suns, and Stan Meyer fuel cells) must be cost effective and during implementation can't depend upon government subsidies in production. They shouldn't begin to replace the use of fossil fuels, until they are demonstrated to be cheaper (in total costs) than use of fossil fuels. We must avoid the government subsidies of any green new deal to avoid false economies. Any green new devices must pay their own way and provide locally produced resources.

Don't Worry about Running Out of Things. We don't need to worry about running out of power being produced by the sun as long as the sun continues to produce energetic gravity (or discrete gravitons). A part of the energy in its gravity is converted to radiant energy in the form of light. We don't need to worry about running out of production of new matter in this universe as long as this universe keeps producing energetic gravity (or discrete gravitons) and light. Upon gravity pulling down of light, a portion of the energy of the produced gravity is converted to new matter or dark spirit matter, from which obedient spirit matter comes new hydrogen. We don't need to worry about running out of production of new space in this universe as long as this universe keeps producing light and gravity (meaning discrete gravitons). Upon gravity pulling down of light, a portion of the gravity also provides new space or dark energy.

The Wheel. I also think that the "wheel" can't be fully invented until the Bessler principle is properly known/understood and thus until it is known what the "wheel" is fully capable of doing with the help of gravity. See ***GWU*** pp. 106, 486, and 505. See ***BLBD*** pp. 25 and 48. In particular, in 1717 Bessler wrote, "A wheel appears", near the chiastic center of his coded little book parable. See p. 486 of ***GWU*** or see p. 225 of ***PM97*** or see p. 295 of ***Poetica Apologia*** or in Bessler's German on p. 104 "Man sieht ein Rad". I am hopeful that besides the Yildiz magnetic motor, finally another practical perpetual motion wheel/device will fully appear, which will also clearly use/show the Bessler/ED.L. principle, and will thus finally be fully invented. At least, it needs to be well understood and recognized that because of the "wheel" our greatly productive sun (with its continual source of much energetic gravity) is an abundantly-bountiful perpetual source of vast radiant power. The appearing wheel need not be very far from our view, if we fully consider the sun, which shines each day. Nothing can permanently block the rotational energy revolution coming forth, since it is coming with the Yildiz devices, the GEET reactors, and new devices. Nothing can permanently block the truth about the wheel going forth regarding the Bessler principle, since the truth about the wheel is going forth.

Nothing Can Permanently Block the Truth. Skeptical people might say, without doing the proposed test, that a solution based on the Bessler principle to one enigma (despite much data for it) is speculative. It is not speculative when the proposed tests are confirmed. When there are many (approaching toward 89) enigmas with solutions based upon the Bessler principle and when doing the

proposed tests, then it is especially not speculative but increasingly becomes greatly data driven with regard to solutions. Does the "informed" analyst insist on no solutions for close to 89 enigmas instead of following Occam's razor regarding the overwhelming situation based upon a great amount of data? I have provided many tests/experiments for further study of the many enigmas. There are many solutions to many scientific enigmas but the analyst needs to be able to look outside the box enough to see the solutions are right in front of the analyst's face. The vast preponderance of the data and tests is in the favor of the Bessler principle. There has been an amazing lack of doing some additional experiments and tests regarding the Bessler principle. The rotational energy revolution cannot be blocked permanently. The truth cannot be permanently blocked from coming forth.

APPENDIX A SOME MORE SOLUTIONS

A.1 Double-helix Vortex-Tube

Geometry. I should explain why the horizontal double-helix vortex-tube filled with water will rotate water molecules and cause water to flow more readily despite effectively having interference of a twisted strip of material within the tube, effectively separating each helix from the other. One can imagine for The Vortex Water Revitalizer™ a gently twisted strip of metal contained in a horizontal tube. For example, see the cut away view of a nearly horizontal double-helix vortex-tube in the fourth image in https://www.alivewater.ca/viktor-schauberger/ or see the cut away view of a nearly horizontal double-helix vortex-tube in the top image of https://www.alivewater.ca/vortex-water-revitalizer-benefits/. I will also provide an analysis for the vertical tube case.

Rationale for Horizontal Tube Case. Hopefully the interior surfaces are smooth with no bumps or disruptions. The HOH water molecules flowing up or down one side of the tube cause those water molecules and their atoms next to the interior surface of the tube to in-part roll or internally rotate more rapidly about horizontal axes through their centers. The electron overlap, between the atom and its nucleus, causes many such nuclei to rotate more rapidly about nearly horizontal axes, through their centers. The Bessler principle causes many such nuclei to rotate more rapidly about horizontal axes through their centers, which causes the atoms and their molecules to rotate more rapidly about horizontal axes, through their centers. Rolling interaction, with atoms of the surface, cause the centers of the molecules to have slightly greater translation speed, despite having introduced obstructions in the tube. There can be some friction between nearby surface molecules rotating the same direction, if the water molecules are allowed to touch each other. All the molecules next to the tube surface on both sides of the metal separator rotate in the same direction. The next inward molecules should tend to rotate in the opposite direction (and somewhat acquire rotational kinetic energy from the Bessler principle), to minimize friction between the molecules. There would tend to be an alternating of the rotational direction, as we progress inward toward the center of the horizontal tube. Think roughly of sets of gears. They roll by each other and tend not to interfere with each other. The separator surfaces

sometimes acquire and sometimes don't acquire help from the Bessler principle, since the water molecules next to them can involve rotations about different axes, from horizontal to vertical axes.

In my mind, the horizontal double-helix vortex-tube provides much benefit over a horizontal tube without any separator, since the horizontal double-helix vortex-tube provides many more cases of HOH water molecules rotating about horizontal axes.

Vertical Tube. Even if the double-helix vortex-tube is vertical it should still provide benefit by the Bessler principle for water flowing in it. The HOH water molecules flowing up or down one edge can cause those water molecules and their atoms next to the interior surface of the tube to in-part roll or internally rotate more rapidly about horizontal axes through their centers. The analysis is similar to the horizontal tube case but I will nearly repeat the words here. The electron overlap, between the atom and its nucleus, causes many such nuclei to rotate more rapidly about nearly horizontal axes, through their centers. The Bessler principle causes many such nuclei to rotate more rapidly about horizontal axes through their centers, which causes the atoms and their molecules to rotate more rapidly about horizontal axes, through their centers. Rolling interaction, with atoms of the surface, cause the centers of the molecules to have slightly greater translation speed, despite having introduced obstructions in the tube. There can be some friction between nearby surface molecules rotating the same direction, if the water molecules are allowed to touch each other. All the molecules next to the tube surface on one side of the metal separator locally rotate in nearly the same direction. The next inward molecules should tend to rotate in the opposite direction (and somewhat acquire rotational kinetic energy from the Bessler principle), to minimize friction between the molecules. There would tend to be an alternating of the rotational direction, as we progress inward toward the center of the horizontal tube. Think roughly of sets of gears. They roll by each other and tend not to interfere with each other. The separator surfaces acquire help from the Bessler principle, since the water molecules next to them involve rotations about horizontal axes.

In my mind, the vertical double-helix vortex-tube provides little or no benefit over a vertical tube without any separator, since the horizontal double-helix vortex-tube provides approximated no more cases of HOH water molecules rotating about horizontal axes.

Prefer Horizontal Double-helix Vortex-Tubes. I suspect that the use of the horizontal double-helix vortex-tubes should be preferentially to the use of the vertical double-helix vortex-tubes. In other words, I suspect it is better to use the double-helix vortex tubes in horizontal positions than to use them in vertical positions.

Some Benefits. For the horizontal double-helix vortex-tubes, I think that there is a benefit of improved water flow from the faster rotating and counter rotating molecules, which can also break up clusters of water. If not broken up, water clusters can come from magnetic dipoles of HOH water molecules rotating

about horizontal axes by the Bessler principle, which dipoles can form strings, with HOHHOHHOH strings forming into sheets, and finally the sheets stacking with other sheets or thus cluster volumes of the water molecules. Stagnant water clusters are thus avoided using a horizontal double-helix vortex-tube. After running water through the vortex-tube with improved water pressure, the diversely rotating molecules would tend to absorb better into soil and plants, which would tend to have greater benefit for plants. There are a variety of other benefits. See a list of benefits after the fourth image in the link about viktor-schauberger.

If these benefits, including improved water flow, come from a horizontal double-helix vortex-tube, then those things would provide evidence in favor of there being a Bessler principle.

A.2 Water Bridge

Regarding the phenomena of the water bridge, the URL of https://www.youtube.com/watch?v=Qr5grxFohqQ said, "When a potential difference of about 10 kV is created between two glasses of water, a thin water bridge can form between the glasses. Surface tension forces keep it suspended, and electrical pressure forces prevent the bridge from disintegrating into individual drops." I think that there is more to the story. I think that there are many somewhat-horizontally-elongated water molecules or long HOH magnets rotating rapidly about somewhat horizontal axes by the Bessler principle. The rapid rotations about somewhat horizontal axes can form especially strong magnets. The magnets form into attractive chains/strings with reduced mobility. Then the attractive strings form attractive sheets and the attractive sheets form attractive volumes. These create a type of nearly-horizontal volume-attractive-tension within the water, which by the Bessler principle can be much stronger than mere tension in the surfaces. The video attributes surface tension as the primary force that provides support for the water bridge but I think that the magnetic chains provide much-greater internal-attractive support. The magnetic strings, sheets, and volumes may be providing much of the adhesion that is providing the nearly-horizontal water bridge. Necks tend to not form in the water bridge because of the presence of the strong magnetic strings. Because of the nearly unbounded nature of the Bessler principle, I think that the horizontal magnetic attraction can be much greater than any bounded electric dipole attraction in water (H_2O) molecules where the oxygen side is negative and the H_2 side is positive. The magnetic strings would align with other magnetic strings, with each adjacent string offset half way between the atoms of the adjacent string. Surfaces could align to make magnetic volume clusters.

Why Large Potential Needed? Why was the 10 kV or greater than 6 kV needed to maintain the bridge? The large potentials create strong currents running through the water bridge. Because of the presence of magnetic strings, the strong currents are formed by motion of electrons and not usually the motion of ions. Neither neutral magnetic string water molecules nor neutral polar water molecules would have any motion so they would not contribute to the currents. The strong currents/motion of the electrons create magnetic fields, which magnetic fields coming from the currents are strongest at the edges and go to zero at the center

line. The magnetic fields would be somewhat horizontal roughly near the bottom and top of each portion of the water bridge. With some gravitons coming from near the horizon, that could induce some magnetic strings to be vertical at the sides of the water bridge. There would be bands of magnetic strings around the edges. There would be strongly-attractive local magnetic-strings, local sheets, and local volumes that would hold the water bridge together. The centers of the water bridge, without any magnetic fields at the center line due to the current, could have nearly horizontal magnetic strings supported by external nearly horizontal magnetic fields from the earth. Near the center line, those nearly horizontal magnetic-strings could form into local magnetic sheets and local magnetic volumes, which give internal support to the water bridge. Any small neck in the water bridge could cause the current to flow through such a smaller neck. The magnetic fields would be stronger at the edges, which would cause magnetic strings, sheets, and volumes to cling to those stronger magnetic fields. That would thicken out the neck to normal size, as more magnetic strings attempt to cling to those stronger magnetic fields.

I think that the water bridge phenomena provides evidence for there being a Bessler principle.

A.3 Partial Explanation for a Working Stanley Meyer Fuel Cell

For some references to the Stanley A. Meyer water fuel cell, see https://en.wikipedia.org/wiki/Water_fuel_cell. I will try to fill in some details which I think have been left out of proper explanations of how Meyer 's fuel cell could be set up to work, given knowledge of the Bessler principle. If people don't understand the Bessler principle, then they likely can't understand how the Meyer fuel cell might actually be made to work.

Stagnant Water Inhibits Rotational Ripping Apart of Water. In case pure water is allowed to be stagnant, there would be nuclei rotating about horizontal axes, within the water molecules because of the Bessler principle. That would cause there to be magnetic water molecules HOH in lines parallel to magnetic fields, assuming those magnetic fields are somewhat horizontal. Those HOH molecules would join with other such molecules to form longer magnetic strings (HOHHOHHOH etc.). The magnetic strings would align with other magnetic strings to form magnetic sheets. The magnetic sheets would align with other magnetic sheets to form magnetic volumes or internally cohesive water clusters. You can get somewhat of an understanding of the water clusters, if you put some pure stagnant water into a blender for blending, then stop the blending with the clusters broken up and try to blend it again with the clusters already broken up. Can you hear the difference, as the blender strains to chop up the clusters, then doesn't strain to chop up the already chopped up water clusters? I am thankful to Jorge R. Zavala for providing me that information about breaking up the water clusters using a blender. The magnetic clusters would not allow the hydrogen atoms to be rotationally ripped away by the Bessler principle, as I will try to explain below. The water needs to effectively be mixed at a local level, if it is to be rotationally ripped apart.

Water Molecule Is Electrically Polar. A "normal" water molecule of H_2O, when it is by itself, has a positive and a negative end. The oxygen end is negative, since the oxygen end tries to fill its two missing holes in its shell with electrons coming from the hydrogen atoms. The end with the two hydrogen atoms is positive, since the electrons are somewhat pulled away from that end. For normal water, the angle between the hydrogen "atoms" with respect to the oxygen "atom" is said to be about 104.5 degrees.

Rotationally Ripping Apart Water? How could the Bessler principle be used to rotationally rip away the hydrogen atoms from a "normal" water molecule?

Horizontal Polar Water Rotated by Bessler Principle. An electrically polar water molecule could be held in an electrically horizontal orientation by the temporary presence of a horizontal electric field. We wouldn't want to use a steady electric field and Meyer didn't do that. See Fig. 22 (and also on the front cover of this book, ***MSEHNS***), where the atoms (within H_2O) are drawn bigger and further apart so that they may be readily seen. Temporarily the left vertical plate would be positively charged relative to the right vertical plate. A steady electric field would be somewhat stagnating and thus anti-productive. We don't want to be operating on the internally-cohesive magnetic-water-clusters. Meyer seemed to favor increasing horizontal electric fields during short-times of horizontal electric field pulses. Ignoring outside interference, such a polar water molecule could be free to rotate about its horizontal polar axis. A slight amount of angular speed of the molecule about a horizontal axis could cause the contained nuclei to increase in angular speed about horizontal axes. The Bessler principle would cause such nuclei to increase in angular speed about horizontal axes. Then the increased angular speed of the nuclei would cause the molecule to increase in angular speed about a horizontal axis. Thus, the molecule could continue to increase in angular speed about the horizontal axis by the Bessler principle. As a molecule begins to rotate about a horizontal axis, an increased voltage (over a short time) would help it maintain a stable horizontal axial orientation (despite increases in angular speed) and thus derive greater benefit from the Bessler principle. The increase in angular speed would cause an increase of the separation angle of the hydrogen atoms with respect to the oxygen atom beyond the initial angle of 104.5 degrees. With continued progress, this could cause the two hydrogen atoms to be rotationally ripped away from the water molecule. The energy associated with such disassociation of water molecules into oxygen and hydrogen would be much smaller than the usual energy of water being "statically" broken up or disassociated (for example by using strong vertical electric fields, which would not allow the Bessler principle to come into "play"). The bulk of the energy for disassociation using increased rotation of electrically polar water molecules about horizontal axes would be provided by the Bessler principle. The Bessler principle does the "heavy lifting". I think that the critics of Meyer were ignorant of the Bessler principle. They would be wise to acquaint themselves with the fundamental physical principle, if they want a clue about what Meyer was doing and if they want to understand a multitude of other physical phenomena.

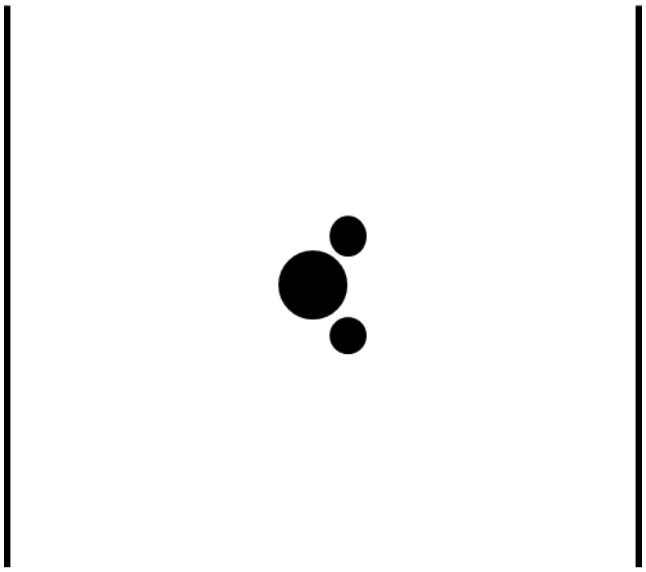


Fig. 22. Meyer fuel cell created rotational resonances in water molecules using temporary horizontal electric fields.

Capacitor Provides Increasing Horizontal Electric Fields. A water-filled capacitor with parallel vertical plates (with horizontal surface-normals) can supply horizontal electric fields. Alternately a cylindrical capacitor, with its central axis of rotational symmetry being vertical, could produce many horizontal electric fields. In either case, the voltages associated with the horizontal electric fields can be made to increase with time in short pulses. The voltages during Meyer's very short pulses can be step-ramped or can be an increasing ramp.

Assume Long Enough Pulses and Horizontal Aligned Magnetic Fields. I think that the short-time ramp-up of voltage must be long enough in time for the water to be disassociated, unless we try to use multiple pulses for each disassociation. I suspect that Meyer used multiple pulses. I suspect that a capacitor using vertical plates would do best if the horizontal electric fields are either parallel to or antiparallel to surrounding horizontal external magnetic fields. There would be one direction of the magnetic fields, which would provide a constant outward force (for a constant angular speed and a constant radius of circular motion about a horizontal axis) on a proton/hydrogen for additional help in ripping apart the water molecule, according to $\mathbf{F}=q\mathbf{V}X\mathbf{B}$. The other direction would provide constant inward force. The symbols are **F** for the force, q for a rotating charge, **V** for the velocity of the charge and **B** for the magnetic field. That direction for the most beneficial magnetic fields would depend upon which way the protons happened to be rotating. Reversing the angular velocity would cause the opposite magnetic fields to be most effective in helping to rip the molecule apart. The ripping apart could be done even without the parallel/antiparallel horizontal magnetic fields but I think that providing such magnetic fields should help keep things balanced. There would be more direct magnetic forces parallel/anti-parallel to the magnetic fields and

electric fields, because of the nuclei rotating about horizontal axes, effectively produce local magnetic dipoles.

Cylindrical Capacitor. If we are given a surrounding horizontal magnetic field and if a cylindrical capacitor (with a vertical axis of rotational symmetry) is used, then that guarantees that there would be only two vertical regions where the horizontal electric fields would either be parallel or antiparallel to the horizontal magnetic fields. Elsewhere there would not be alignment of the fields. If the magnetic fields are necessary for disassociation, then I don't think that one should use a cylindrical capacitor (with a vertical axis of rotational symmetry), since it would not provide enough regions to rotationally disassociate water molecules. An exception could occur if the horizontal electric fields are the dominant influence so that the magnetic fields are only a small perturbation on the situation. I don't think that Stanley A. Meyer included the information about the assistance of the horizontal magnetic fields aligned with the horizontal electric fields in his patents so that might have caused some difficulties for people trying to follow his patents. He did refer to a "conventional torroidal core" (using the spelling in his patents instead of toroidal) but I think that was with respect to the circuit for forming his stepped waveform pulses.

Flat Vertical-plate Capacitors. If the ignoring of the magnetic fields approach doesn't seem to work experimentally, then I suggest that people supply the appropriate magnetic fields to flat vertical-plate capacitors so that the horizontal electric fields are either parallel or antiparallel to the magnetic fields for many locations.

Increase Voltage during Pulses for Rotational Axis Stability. As the angle of the hydrogen atoms is larger due to the molecule increasingly being rotationally ripped apart, then I think a much larger voltage would be needed to provide a stable rotational axis. Having a stable rotational axis (with the two hydrogen atoms being equal distance from the rotational axis) is essential for the molecule to be rotationally ripped apart. The ramping up of voltages need not be linear but could greatly increase with time, as it nears the time of disassociation. If you can't see when a molecule is getting close to being disassociated, then it is a little tricky invoking greatly increased voltages. You need to assume that there are sufficient numbers of molecules, which are getting close to being disassociated for a large increase in the voltages to be beneficial. A larger angle means a much shorter horizontal distance between the oxygen and the hydrogen atoms. With a shorter horizontal distance, a much larger voltage would be needed to account for a much shorter "lever arm". Stanley Meyer didn't specifically address such tricky considerations in his patents. What he wisely did though was to look for experimental resonances. It could take some very careful experimental study to keep the molecule rotating about a horizontal axis as it is being rotationally ripped apart by the Bessler principle. People trying to replicate Meyer's water fuel cell must be very careful to maintain this fine balancing act. Simulations incorporating the Bessler principle may provide some guidance for selecting the curves for voltage versus time.

Patents. Stanley A. Meyer had various patents for his fuel cell. An overview patent may be seen in https://patents.google.com/patent/US5149407. The older patent https://patents.google.com/patent/US4936961 is simpler (in figures and discussion). I think the older and simpler patent gets to the more important essentials with which I am more concerned. Both of those patents used the phrase "induces a resonance within the water molecule", which suggests to me that Meyer was using a resonance of the rotational ripping apart of the water molecule, as powered by the Bessler principle, even if he didn't really understand what it meant physically. He didn't say that the resonance was rotational, which causes my doubting of his understanding of the Bessler principle. If he understood about the Bessler principle, he was hiding that information. It is wrong to assume that the Bessler principle in the presence of horizontal electric fields can't be used to greatly reduce the energy of dissociation of water. As I discussed above, with greater rotations about horizontal axes, the electric dipoles of the water molecules are shortened requiring much larger horizontal voltages to maintain stable rotations about horizontal rotational axes. Those voltages might need to be applied in the presence of parallel/antiparallel magnetic fields. Properly following these tricky details would allow gravity-powered perpetual-motion-machines to be produced, though currently not considered by experimentally-blinded "scientists", who seem to be satisfied with quick flawed-experiments and then saying "See we told you it couldn't be done." I think it is actually a fine balancing act requiring things to be done just right, if we are to rotationally rip apart the water molecules using the Bessler principle. We need to look for the resonances, which Meyer found.

Locally Mix Water to Rotationally Rip Apart Polar Water. Polar water molecules need to be present for the hydrogen atoms to be rotationally ripped apart. There could be a favorable external magnetic field parallel/antiparallel to the electric fields. Meyer used pulses apparently to break up the magnetic clusters to in part keep the water mixed on a locally fine level. He would not have used steady or constant horizontal electric fields (meaning voltages on his vertical plates type capacitors), which might have favored the formation of magnetic strings, sheets, and volume clusters.

Use of Vortex Tubes to Help Mix the Water. It could be that the Meyer fuel cell might also benefit from using a horizontal double-helix vortex-tube to also help avoid water clusters. For example, as bubbles are generated by the disassociations of the water molecules, the output of a horizontal tube could supply more water to the base of the capacitor. One could also take out water and run it through a vortex tube to help mix the water. Doing such things might help the water molecules to be more locally mixed up and not form internally cohesive magnetic clusters. If it turns out that the effect of the magnetic fields is small relative to the horizontal electric pulses, then a vertical cylindrical capacitor could be fed at its base by a horizontal double-helix vortex-tube to hopefully provide better results.

Magnetic Fields Might Be Ignored. Since Meyer didn't discuss in his patents the alignment of the magnetic fields with the horizontal electric fields, it is likely that the resonances, which he found, did not depend much upon the magnetic

fields. The effect of the increasing horizontal electric fields, during the short pulses, likely dominated over the effect of the magnetic fields.

Possibly Study Effect of Aligned Magnetic and Electric Fields. In case the magnetic fields was something that Meyer overlooked, if people want to check out the effect of those magnetic fields, they might simply supply a large "C-shaped" permanent magnet to give magnetic fields parallel/anti-parallel to the horizontal electric fields supplied by a vertical plates type capacitor. See Fig. 19 or the magnet on the front cover of this book to somewhat get an idea about the magnetic fields.

If using my suggestions allows a Meyer water fuel cell to rotationally rip apart hydrogen atoms from oxygen atoms in water using very little power (relative to the normal power for disassociation of water), then those things would serve as evidence that there is a Bessler principle.

A.4 Reasons Why Electrons Effectively Lost from Earth's Surface to Atmosphere

Consider this statement, "Since the earth is continuously losing electrons into the atmosphere, the bottom of the storm cloud usually contains an abundance of electrons immediately before a lightning flash and is therefore negatively charged." See that statement on p. 102 of ***Out of the Blue: A History of Lightning: Science, Superstition, and Amazing Stories of Survival*** by John S. Friedman (2008). I will try to provide reasons why electrons are effectively lost from the surface of the earth to the atmosphere. One or more of the reasons may apply.

Bessler Principle Causes Molecules to Rotate about Horizontal Axes. If a molecule rotates a little about a horizontal axis going through its center of mass, this causes the nuclei within to rotate a little about horizontal axes going through the centers of mass of the nuclei. The Bessler principle causes the nuclei to rotate with greater angular speed about horizontal axes going through their centers of mass. That would cause the molecule to rotate with greater angular speed about the horizontal axis going through its center of mass, as long as the extra angular speed is not removed by something like friction. When this process is allowed to proceed, without much removal of the angular speed as occurs at higher elevations, then the Bessler principle will have caused the molecule to rotate more rapidly about the horizontal axe going through the center of mass of the molecule.

First Reason for Earth Effectively Losing Electrons. For example, some H_2 or hydrogen molecules in the atmosphere will by the Bessler principle rotate rapidly about horizontal axes through their centers of mass. Such rapid rotations can occur for some of the hydrogen molecules. Enough rotational speed can separate a hydrogen molecule into two hydrogen atoms. The Bessler principle can cause a hydrogen atom to rotate rapidly about a horizontal axis going through its center of mass. In some cases, the electron can be attracted to the rapidly rotating nucleus (a proton) within the hydrogen atom and be struck by the interaction. The electron can be ejected. That ejection can even happen before the hydrogen atoms separate but it could have a similar effect. The nucleus is a massive dense proton, as compared to the small-mass, less-dense electron. Especially in an initially more neutral atmosphere, the massive dense proton would tend to fall because of gravity,

whereas the lighter less-dense electron would tend to be buffeted upwards by its interactions with other atoms/molecules. I think that is a primary rationale why the earth or ground is primarily electrically somewhat positive and electrons are effectively lost to the atmosphere.

Second Reason for Earth Effectively Losing Electrons. According to p. 111 of ***Out of the Blue*** Basil Schonland used a galvanometer to observe "… in fair weather electrons flowed from the earth to the tree, but when a thundercloud was overhead, the current changed direction and electrons poured back into the earth." The second part of that statement is clear, since with storm clouds overhead, having many electrons near their base, the negative electrons would repel negatively charged electrons from the ground below the cloud. The first part of the statement from p. 111 was not so clear. A reason for why that might occur would be as follows. The bigger xylem cells in trees cause water to go up the tree, while the smaller phloem cells allow water to flow down the tree. Both cells could allow short chains of water molecules (HOH) to rotate about horizontal axes as the water is moved. Extra energy for transporting water up could be provided by water molecule chains rolling up the insides of xylem cells using the Bessler principle slightly similar to extra energy provide in the vortex tube in A.1. With rotations of nuclei about horizontal axes that could occasionally cause electrons to be ejected. The electrons lost would need to be replenished by electrons going up the trees from the earth as observed.

Third Reason for Earth Effectively Losing Electrons. Lightning, using the Bessler principle, can rip away many electrons by nuclei rapidly rotating about horizontal axes. Many of the positive ions left behind can fall toward the earth, since without their electrons they are denser than before their electrons were lost. The isolated electrons can be buffeted upwards.

The three stated reasons why the earth is continuously losing electrons into the atmosphere serve as evidence that there is a Bessler principle. I couldn't think of a reason that didn't depend upon the Bessler principle.

A.5 Why Clouds Separate Charges.

I will try to provide reasons why as mentioned above in A.4 from ***Out of the Blue*** p. 102 "…the bottom of the storm cloud usually contains an abundance of electrons immediately before a lightning flash and is therefore negatively charged." I will also try to provide reasons why the tops of clouds tend to be positively charged.

Clouds Allow Charge Separations. Within clouds, positive charges rise to near the top, while negative charges may accumulate near the base of the clouds (in the absence of lightning strikes partly removing such charges). I will try to show why that is so. Negative electrons accumulate near the bottom edges of clouds, since they are electrically attracted to the positively charged ground. Molecules and water droplets near the center base of a cloud can increasingly rotate about horizontal axes by the Bessler principle. They will tend to shed electrons especially when they interact with other rotating molecules and rotating water droplets. They would also eject electrons, since nuclei within are rapidly rotating about horizontal

axes so they can strike and eject attracted electrons. The newly ejected electrons are then available to be attracted to the positive ground. The positively charged rotating molecules and water droplets are continual sources of rotational kinetic energy by the Bessler principle. When they come into contact with nearby gas molecules and atoms, their interactions transfer some of their rotational kinetic energy to them, thus producing a nearby higher temperature gas. A higher temperature gas tends to rise, as a hot air balloon rises into the air. A hot air balloon rises, since the hot gas within the balloon is less dense than the surrounding air. A smaller mass of hot gas balloon can displace the same volume as a colder more-massive gas balloon, thus it is the less massive hot gas balloon which rises as it is buoyed upward by the surrounding colder-heavier gas. People using hang gliders need to be very careful that they are not sucked up into clouds. Getting back to the point, the positively charged rotating molecules and water droplets rise with the upward air currents of the nearby warmer gas. Positive charges in the rotating water droplets tend to rise to near the tops of the clouds. There is greater and greater separations of charges until something needs to occur to relieve the imbalance or imbalances. On p. 3 of ***Lightning*** by Martin A. Uman McGraw (1969), it says, "Although the most frequently occurring form of lightning is the intracloud discharge, the greater part of lightning literature concerns the ground discharge."

The idea that clouds can separate charges provides evidence for the Bessler principle.

A.6 Reasons for Lightning Occurring Given Clouds

On p. 98 of ***Out of the Blue*** Martin Uman indicated, "Nothing is really known about lightning," he says. "We know that the light goes here and the light goes there, but why it starts, where it starts – that's very much unknown." Using the Bessler principle, I will attempt to resolve various mysteries about lightning.

Given the prior discussion in A.5 using the Bessler principle, within clouds, positive charges rise to near the top, while negative charges are near the base of the clouds, prior to lightning strikes. I will try to show why such separate charges in clouds enhance the chance of lightning starting and then why the lightning striking the ground proceeds. There could be less visible lightning strikes but I am just dealing with the more visible ones here.

Forming Plasmas. The negative electric charges near the base of the clouds can create especially positive regions on the electrically positive ground. These vertically separated charges can create great regions of electrically-polar separations in intermediate-elevation water molecules. The electrically-polar water molecules can often be caused to rotate about horizontal axes by slight interactions with other polar water molecules. This will cause the nuclei within to rotate about horizontal axes through their centers of mass. The Bessler principle will cause the nuclei within to rotate with greater angular speed about horizontal axes through their centers of mass. This will cause the molecules and the nuclei to rotate with greater angular speed about horizontal axes. Because of the Bessler principle either (1) there will be interference with other rotating molecules whereupon electrons can

be knocked off or (2) there will be attracted electrons struck by rapidly rotating nuclei or (3) the water molecules can be rotationally ripped apart by the Bessler principle, allowing then their atoms to be caused to rotate especially rapidly about horizontal axes through their centers of mass often providing ejected electrons. Often the process results in positive ions and speedy electrons, which with other ions and electrons become a plasma. The ions and nuclei will continue to acquire additional rotational kinetic energy by the Bessler principle.

Downward-moving Initial or Stepped Leader

Selection of Starting Location in Cloud. The presence of much humidity increases the likelihood of more plasmas forming, since the electrically polar water molecules upon interactions with other things cause some water molecules to rotate about horizontal axes, with that process leading to plasmas. Such plasmas can especially occur near or just below the bases of clouds, where there is much water vapor, little rotational interference, and there are strong electric fields.

The question occurs, "Where will the lightning rupture begin or initiate?" It is an ever more unstable situation, with more negative charges continually forming near the base of the cloud, with there being continually more intermediate plasmas, and with more locations of plasmas forming near the base of the cloud. Forked plasmas allow for the accumulation of negative charges (electrons). Assuming that the negative charges are not depleted by intracloud discharges, there will be a winning location that is most conducive to initiating the downward initial or stepped leader of lightning, with enough plasmas to allow conduction/accumulation of electrons.

Downward-moving Initial or Stepped Leader. See ***Out of the Blue*** p. 112, "…creating a faintly luminous trail called the *initial* or *stepped* leader." A rupture point will occur that allows some flow of electrons down from the cloud. If it can't find a path in the plasmas, it would need to select a new rupture point from the base of the cloud. A found path can't take much current of electricity with the saturated narrow plasma path. The best path selected so far creates strong electric fields to further encourage the formation of tiny plasmas formed by means of the Bessler principle, according to the above paragraph, "**Forming Plasmas**". If it can't find a path it will need to branch out from the path and find another path. It needs to work its way downward.

Many tiny plasma sites can allow electrons to flow downward through the plasmas. The flow of charges creates nearby-strong magnetic fields with many of the magnetic fields being horizontal. The horizontal magnetic fields can cause more molecules, atoms and nuclei to rotate about horizontal axes. More electrons would be produced creating more plasma locations. The plasmas would support the flowing of more electrons.

As the initial or stepped leader starts to go down from the cloud, there are many potential paths to choose from according to the many locations of ionization forming tiny plasmas between the cloud and the ground. As the initial or stepped leader approaches the earth there is a near absence of tiny plasma routes to choose from to provide a sustained path to electrical ground. A path needs to be created in the

ionized streamer. See ***Out of the Blue*** p. 112 saying, 'Schonland discovered that when the initial leader is within just 60 to 450 feet of the ground, it "pauses, ever so briefly, like a snake, before striking some elevated object." '

An alternate route would need to be created, when the initial or stepped leader fails to connect by itself from above with a grounded source.

Upward-moving Ionized Streamer

See ***Out of the Blue*** p. 112 saying, "creating an ionized streamer that rises from the earth to meet the advancing leader." A path needs to be created from at least an electrically-grounded source. It would be simplest to start with a well-grounded source but it might be necessary for the lightning to have to start with some other grounded source to start the upward ionized streamer. If there are multiple sources, then it could be a competition/merger. Electric fields nearby a "source" should cause plasmas to be created and electrons released. Some of the released electrons would be attracted to go down into the grounded source bringing nearby currents and more magnetic fields, which will produce more plasmas and release of more electrons. That "upward-moving" ionized streamer could even penetrate through sand to begin the tiny start of "fulgurites" (p. 115 of ***Out of the Blue***). The gaps in the sand in the presence of strong electric fields allow the creation of tiny plasmas. Water vapor in the gaps of the sand should help create the tiny plasmas. Other "grounded" sources could be a tree with moisture in its cells. The upward-moving ionized streamer is attracted upward to the above bottom or end of the initial or stepped leader, with much ionization between them finding an upward path.

Downward-moving Final Leader

See ***Out of the Blue*** p. 112, "When the two join, the ionized path from cloud to ground is completed and a final leader blazes a faint trail to the earth, charging the air around the path with electrons."

More electrons flow in a now established path connecting the cloud and the ground. This creates surrounding magnetic fields with many of the magnetic fields being horizontal. The horizontal magnetic fields can cause more molecules, atoms and nuclei to rotate about horizontal axes. More electrons would be ejected by rapidly rotating nuclei thus creating more plasma locations visible in the faint trail to the earth of the final leader.

End of Final Leader. At the end of final leader, there would be a plasma as many electrons are dumped to the electrical ground. That would be the start of the upward-moving main or return stroke.

Speeds. On p. 113 of ***Out of the Blue*** refers to studies by Basil Schonland showing, "He measured the velocity of the strokes and discovered that the typical downward leader travels at an average speed of about 250 miles per second, while the main return stroke rebounds at an average speed of about 61,000 miles per second." One can compare those speeds with the speed of other things. The speed of light which is about 186,000 miles per second (or about $3.00*10^8$ m/s). ***Out of the Blue*** p. 104 says, "Since sound travels 1,090 feet per second, or about one mile every five seconds, …" On p. 4 of ***Lightning*** by Martin A. Uman McGraw (1969),

Uman provides variations of lightning within a table on p. 4. The representative speeds in m/sec are $1.5*10^5$ for the initial or stepped leader, $2.0*10^6$ for the dart leader, and $5.0*10^7$ for the return stroke. The dart leader is apparently another name for the final leader.

Upward-moving Main or Return Stroke

There is no shadowing by intermediate plasmas at the end of the final leader, with there being strong electric fields as the final leader connects to the electrical ground. This causes a stronger plasma to form, which is the beginning of the upward-moving main or return stroke. See ***Out of the Blue*** p. 112 which says, "What actually happens is counterintuitive. We think of the main flash as traveling from the sky to the ground, but in fact it travels from the ground to the sky." I need to explain how the main or return stroke can occur and how it can move so rapidly upward. See Fig. 23 for a drawing of an upward moving main or return stroke of lightning going upward from the ground to a cloud. Later, I will cover lightning within clouds.

Fig. 23. Upward moving main or return stroke of lightning.

Discrete Electric Fields. By discrete electric fields moving at the speed of light, one plasma can provide great speed to the upward-moving main or return lightning stroke. The discrete electric fields coming from moving charges are discrete magnetic fields, which magnetic fields move at the speed of light. Those magnetic fields cause deviations of charges and nuclei in the sides and weak plasmas upward. The Bessler principle will cause those charges to increase in angular speed, internally and externally. A stronger plasma is produced than was previously there. This process continues as the main or return stroke goes to the cloud in the sky. This process also widens the path of the main plasma making the stroke much more visible. Down within sand, near the start of the main plasma,

the plasma become as wide as the fulgurites or see p. 115 of ***Out of the Blue*** which said, "the sand resolidifies as glass to form fulgurites."

With the very rapid main or return stroke going from the ground to the cloud, if not sufficient negative charge (in the form of slow electrons) has been transferred from the cloud to the earth, then there can be repeat strokes. One need not assume that visible strokes or flashes are the same as the slower movement of electrons with less visibility. The slow movement of more electrons all along the path nearly at the same time allows rapid upward increases in brightness.

The reasons for lightning occurring both under and within clouds (as we will next discuss) give evidence that there is a Bessler principle. On p. 101 of ***Out of the Blue*** it says, "An estimated 1.2 billion lightning flashes (intracloud plus cloud-to-ground) occur around the world every year. Rwanda has the most; the North and South Poles the fewest. In the United States there are an estimated 25 million flashes annually." The magnetic poles of the earth tend to prohibit the Bessler principle from operating. The magnetic equators, which horizontal magnetic fields, allow the Bessler principle to operate.

On pp. 117-118 of ***Out of the Blue*** it says, "Among the basic questions researchers are still trying to answer: How is lightning generated in a cloud? How does it strike the ground: Why does it strike what it strikes?" I tried to provide information to answer such questions.

Lightning within Clouds

There could be lightning between charge collections within clouds, especially when much water is available in the clouds and there is electrical attraction between the charges within clouds. There would not be a lack of water molecules to be rapidly rotated about horizontal axes by the Bessler principle to create plasma routes and lightning within water saturated clouds.

I assume that there would be an initial or stepped leader starting from a repository of slow electrons, that there would be an ionized streamer starting from the repository of slower moving positive charges, that after they connected there would be a final leader going from the negative to the positive end, and that then there would be a main or return stroke from the positive to the negative end. The up and down descriptors would depend upon the locations of the charges. I would assume that usually the location of the positive charges would be above the location of negative charges. That need not be the case, since the charges could be located in separate clouds or they could be near the same elevations within clouds. The discussion would be similar to the above case of lightning between a cloud and the earth but the up and down labels could often be reversed. Also the term ground would need to be replaced by forked locations or connections with the positive charges.

A.7 Lightning out of the Blue

Consider ***Out of the Blue*** p. 167 "There was a bolt out of the blue," or p. 102 "Lightning may strike as far as ten miles ahead of a thunderstorm or while the sky is still blue." Consider 'Lightning has even been reported to occur in the clear air (McCaughan, 1926; Gisborne, 1928; Myers, 1931; Gifford, 1950; Baskin, 1952),

apparently giving rise to the expression "bolt from the blue."' on p. 1 of ***Lightning*** by Martin A. Uman McGraw (1969). Those references on p. 12 at the end of his chapter 1 were:

2. Baskin, D.: Lightning without Clouds, ***Bull. Am. Meteor. Soc.***, **33**:348 (1952).

9. Gifford, T.: Aircraft Struck by Lightning, ***Meteorol. Mag.***, **79**:121-122 (1950).

10. Gisborne, H. F.: Lightning from Clear Sky, ***Monthly Weather Rev.***, **56**:108 (1928).

17. McCaughan, Z. A.: A Lightning Stroke Far from the Thunderstorm Cloud, ***Monthly Weather Rev.***, **54**:344 (1926).

18. Myers, F.: Lightning from a Clear Sky, ***Monthly Weather Rev.***, **59**:39-40 (1931).

Begin Explanation. I will try to explain how it is possible that lightning could strike "out of the blue" because of the Bessler principle. I tried to provide reasons in A.4 why (because of the Bessler principle) there would be more electrons at higher elevations, with there being an increase of such electrons in time. That would begin to provide an initial reason for how a lightning strike can occur out of the blue, with the differences in charges accumulating until there is an eventual release of the charge difference in a lightning bolt. Still I thought I should give further reasoning/evidence of how that could occur. The lightning could be initiated by rotating molecules and atoms rotating rapidly about horizontal axes and creating local plasma fields. Lightning would be able to better initiate and propagate with clouds present (as I discussed above in A.6 because of the Bessler principle) but I will continue with this "out of the blue" situation. It may be rare but it is not impossible that there could be other cases of molecules and atoms rotating rapidly about horizontal axes and creating local plasma fields. Molecules and atoms rotating about horizontal axes, going through their centers, would cause their nuclei to rotate about horizontal axes, which by the Bessler principle would cause greater rotational speed about horizontal axes. Those things could form small plasmas that could continue or even grow larger. There are many negative electrons high in elevation and many positive protons in the ground. All that is needed is a plasma conduit to connect the two (the negative sky and the positive ground). Great energy and many electrons produced by plasmas can be unleashed by the Bessler principle, within the plasmas during a lightning strike, even when out of the blue.

Ways to Enhance Lightning Striking. I am thinking that if you wait long enough there will be enough simultaneous plasmas to get a lightning strike going, but I thought I would suggest some ways to enhance the likelihood of the lightning striking "out of the blue". (1) A cosmic ray shower could provide seeds for initiating a lightning strike. You would not see visible evidence that there is a cosmic ray shower. (2) Another possibility for enhancing a possibility of a lightning strike "out of the blue" might be a daytime small meteor event. A meteor, large enough to nearly reach the ground but small enough to not be visible during daylight, could form a line of tiny plasmas that would not be visible but could be seeds for a

lightning strike. (3) Another possibly enhancing event (related to the meteor) might be the falling in the daytime of a tiny bit of space debris. The debris could be big enough to make it nearly to the earth but small enough not be noticed much during the daylight. (4) I think that if the humidity is sufficiently high, without producing any clouds, then that would greatly increase the chance of lightning striking. (5) As long as well away from the Earth's magnetic poles (and preferentially in a region where the magnetic fields are nearly horizontal), there would be a continued accumulation of charge in the atmosphere, by A.4, thus making lightning striking ever more probable to remove the building charge differential, as time goes by. Something would eventually have to give as such a persistent imbalance continues to be ever more out of imbalance and the resolution toward more charge equalization would be a lightning strike. Two or more of these ways/reasons could simultaneously contribute to lightning striking "out of the blue".

How Release Lightning? How can the Bessler principle unleash great energy even if there is neither a pooled-collection of electrons in the sky or a great absence of electrons on the ground? At the top or sky end there may be some feeders allowing a few excess electrons present in the atmosphere to pool together. With a weak network of tiny plasmas between the sky and the ground, there could be a tiny trickle of current. With the tiny trickle of current, that creates very strong magnetic fields, when very close to the current. Many of those strong magnetic fields would be somewhat horizontal. Those strong horizontal magnetic fields allow opportunities for molecules, atoms, and nuclei to rotate about horizontal axes. The Bessler principle could cause them to increasingly rotate about horizontal axes. Situations of very rapidly rotating molecules, atoms, and nuclei rotating about horizontal axes could be created all along the route, in the initial or stepped stroke. As the rapidly rotating positively charged nuclei come in contact with attracted negatively charged electrons, the very rapidly rotating nuclei could strike the electrons and produce many electrons (and light), which electrons are free to move and can even be moving rapidly. All along the route that would continue the processes of more current being produced by more electrons flowing in the plasma route, producing more often-times horizontal magnetic fields, then producing rapidly rotating nuclei, and thus producing more energetic free electrons and light. All along the route there are huge numbers of electrons made available. See the steps in A.6 namely: the initial or stepped stroke, upward-moving ionized streamer, downward-moving final leader, and upward-moving main or return stroke. Electrons could slowly travel as the lightning progresses through the plasmas down to the ground. The presence of the electrons going to the ground can induce some electrons to move to different locations within the positively charged ground, especially if there is good conduction of current in the ground. With that process "avalanching" a powerful lightning strike would then be produced "out of the blue".

Lightning occurring "out of the blue" provides evidence for there being a Bessler principle.

A.8 How X-rays Produced during Lightning Strikes

From Martin A. Uman, John S. Friedman said on p. 118 of ***Out of the Blue***, "It has long been known that lightning emits radio signals, but the discovery that it also emits waves of energy much higher on the frequency scale—X-rays or possibly gamma rays—was news.

From ***Out of the Blue*** (2008) on p. 119, Friedman said Joseph Dwyer "… measures the flow of X-rays, gamma rays, and other types of energetic radiation emitted by the lightning strokes, all moving at nearly the speed of light. His radiation detectors have recorded energetic radiation in eighty-seven percent of the strokes, occurring at the moment when the charge moves down from the cloud and contacted the ground." Dwyer said, "It's right before the visible stroke occurs," and then he said, "That appears to be when the energetic radiation is being produced. Nobody really understands completely how this is happening."

How could such energetic photons be produced during a lightning strike? Well, the Bessler principle comes to the rescue again for possible explanations. One way to explain such phenomena is to consider that there could be some atoms in the atmosphere, which are massive or large values of Z (or number of protons). Such an atom in the atmosphere could acquire fairly large angular speed of its nucleus. An innermost electron could be struck by that rapidly rotating nucleus. The process of an electron being struck could directly produce an X-ray or an even more energetic photon. Also, with a vacant hole in the innermost electron, an X-ray could be produced, when another electron comes along and fills that hole.

The creation of X-rays is contingent upon stable rotations of nuclei about horizontal axes. The rapid rotations about horizontal axes could have been started either before or after the initial or stepped leader. When the powerful visible main or return stroke comes along, it can constitute quite disruptive conditions. There can even be some disruptions by the downward-moving final leader. A strong or powerful plasma can have many magnetic particles go by and disrupt the gentle increase of angular speed about a horizontal axis, by causing the horizontal magnetic moment to be disrupted from the horizontal attitude.

A longer time, with more stable conditions, allows greater accumulation of energy by the Bessler principle. With longer times of accumulation, larger Z atoms would not be required to produce X-rays, though their presence make explanations easier. More disruptive conditions means a more likely termination of the accumulation of energy by the Bessler principle.

As a side note, this sort of process easily explains ways that lightning can produce the lower energy radio signals. The Bessler principle would not need to collect extra energy for as long, as for production of X-rays.

The X-rays occurring during lightning strikes provide evidence that there is a Bessler principle.

A.9 Reasons for St. Elmo's Fire

See pp. 37-38, of ***Out of the Blue*** for St. Elmo's fire. It didn't fully explain how it can occur. It did say on pp. 123-124, "The glow is actually ionized air that

frequently appears to settle on the masthead of vessels in warm weather, …" I will try to provide more complete or underlying reasons why St. Elmo's fire occurs.

Reasons for St. Elmo's Fire. Given a generally positively charged surface, before and after a storm, with negatively charged electrons at the base of clouds, there are regions of especially positive charges, particularly at the top of things like ship masts. That creates nearby regions of strong electric fields, which in the presence of water vapor creates surrounding regions of polarized water molecules. As the polarized water molecules move around, many interfere with others and cause rotations about internal axes, through their centers of mass. Many of the rotating molecules rotate about horizontal axes. That causes the contained nuclei to rotate about horizontal axes, through their centers of mass. The Bessler principle will cause the nuclei to increase more rapidly in angular speed. That causes the nuclei and molecules to rotate more rapidly about horizontal axes through their centers of mass. Nearby negative electrons will be attracted to the positively charged nuclei. The rapidly rotating nuclei can strike the electrons and knock the electrons away, while creating photons of the St. Elmo's fire. Light is produced both as the rapidly rotating nuclei strike electrons and other electrons come along to fill the holes, which were made when attached electrons were knocked away.

Prior St. Elmo's Fire. Before the storm St. Elmo's fire won't occur until the regions of electric fields are created by the positively charged extremities acting on water vapor. The positively charged extremities are "shadows" of the negative charges coming in from the base of the storm clouds. As the storm provides electrons to somewhat neutralize the extremities, the St. Elmo's fire stops.

Post St. Elmo's Fire. After the storm, the storm doesn't provide electrons to somewhat neutralize the extremities, so those extremities become positive and St. Elmo's fire begins. As electrons in the atmosphere (along with some liberated electrons from St. Elmo's fire) somewhat neutralize the especially positive extremities, the St. Elmo's fire stops.

Cases Involving Aircraft. The p. 124 of ***Out of the Blue*** said, "… St. Elmo's fire has appeared along the wingtips, propellers, and antennae of aircraft, …" Depending upon their circumstances, those extremities could be positively or negatively charged in the presence of water vapor. The explanation of such St. Elmo's fire for such electric fields would follow from the above reasons.

The phenomena associated with St. Elmo's fire provide evidence for the Bessler principle.

A.10 Only Two Most Fundamental Particles

Two Most Fundamental Particles. There are only two most fundamental particles, which could be called (1) the positive spirit matter particle and (2) the negative spirit matter particle. I could also say that there are only two most fundamental fields of (1) the discrete electric fields emanating out of the positive spirit matter particle and (2) the discrete electric fields emanating out of the negative spirit matter particle. But even those most fundamental fields could be described in terms of the most fundamental particles. A discrete electric field could

be described in terms of a line of temporarily appearing and disappearing most fundamental particles propagating at the speed of light (or more properly at the speed of the discrete electric fields, which are the most fundamental constituents of light). I suspect that the type of particle that temporarily appears and disappears is the same type as the original particle that gave it origin. Other fields and particles can be described in terms of the most fundamental particles and fields.

Discrete Theory of Everything. See my discrete "Theory of Everything" in ***GWU*** pp. 412-415. Also see ***GWU*** Chapter 13 "FORCE UNIFICATION" on pp. 320-329 or particularly ***GWU*** "13.4 Physics Based on Opposite Fundamental Charges" pp. 325-327. Also see "13.6 Unification Attempt" ***GWU*** p. 328, which refers to "APPENDIX A SOME MATHEMATICAL DETAILS", section "A.6 Unification Attempt for Electromagnetics-Strong-Weak-Gravity" pp. 458-469 of ***GWU*** for more discussion about a possible discrete unification of all the forces.

Graviton. For example, a graviton of gravity is composed of two discrete electric fields coming from oppositely charged most fundamental particles having five constraint conditions for formation and five constraint conditions for absorption. For details see "Chapter 2 GRAVITY BASED ON DISCRETE ELECTRIC FIELDS" in ***GWU*** pp. 45-67. That explains why discrete gravity is so much weaker than the discrete electric fields composing gravity and it explains how there can be a Bessler principle. In particular, see "2.3 Accounting for Gravitational Weakness" pp. 54-67 of ***GWU***.

Discrete Electric Fields. The electric fields directly come from the discrete electric fields. See paragraph "Discrete Electric Field Deliverables" in ***GWU*** pp. 52-53. There are either attractive or repulsive discrete impulses when the discrete electric fields are absorbed. The impulses are attractive, if the originating and absorbing most fundamental charges are opposite. The impulses are repulsive, if the originating and absorbing most fundamental charges are the same.

Magnetic Fields. The magnetic fields are a manifestation of the discrete electric fields produced by moving charges. See "13.6 Unification Attempt" in ***GWU*** p. 328. Also see, "A.6 Unification Attempt for Electromagnetics-Strong-Weak-Gravity". pp. 462-464.

Unified Discrete Theory. My unified theory may be considered to be nearly purely geometric in time, according to those two charge types and the two related types of discrete electric fields. I discussed my discrete theory of everything in ***GWU*** on pp. 320-329, 412-415, and 458-469. I think that my discrete theory of everything might have been more along the lines as slightly suggested by Albert Einstein in his 1954 letter to Michele Besso, where he was prepared to give up on his theory of gravity or give up on physics based upon contiguous structures (see p. 43 of ***GWU***). I suspect Einstein heard of the 13.5° anomaly during the experiment by Maurice Allais of his paraconical Foucault pendulum. The anomaly occurred only during the time of the total solar eclipse on 30 June 1954 (p. 40 of ***GWU***). I think Einstein realized that any contiguous structure of spacetime could not be discontinuously shadowed by the moon, when it was between the sun and Allais' experiment. The theory required a discrete theory of gravity to properly account for

absorption of gravity within the moon to reduce gravity at Allais' experiment. He would have at least needed discrete entities for the basis of gravity or rather "rays of gravity" (pp. 38, 43, 289 of ***GWU***) as Isaac Newton once considered. Einstein may not have known how to proceed with such a discrete theory. I made my best guess with how to construct a discretely mathematical theory purely dependent upon the two types of discrete finest charges and the two types of discrete electric fields traveling at the speed of light from or to such most fundamental charges. The calculations would be extremely intensive because of the huge numbers of entities in four dimensions (three spatial dimensions and time), ultra-fine precision, and ultra-detailed complications associated with the dynamic charge models of extremely large numbers of charges.

Photons. Photons are large collections of discrete electric fields traveling together. See paragraph "Photon Basis" in ***GWU*** pp. 463-464 and the paragraph following it.

A.11 Dark Matter and Dark energy

Though previously mentioned above in the AFTERWORD of this ***MSEHNS***, within section "Beyond the Bessler Principle" within paragraph "Explanations to 16 Enigmatic Phenomena/Issues beyond Bessler Principle" {(8) the dark matter (***GWU*** pp. 291-314 and 381-383), (9) the dark energy (***GWU*** pp. 291-314 and 381-383)}, I thought I would emphasize some more comments. The dark matter and the dark energy were also spoken of above within that same section "Beyond the Bessler Principle" within paragraph, "Light, Gravitons, Dark Matter, and Dark Energy"; here are the more comments.

Bessler Principle Uses Two Pulldowns per Graviton. The Bessler principle demonstrates that gravity can be a sustained source of rotational kinetic power by the continual separate discrete pulldowns on rotating matter. My free book, ***GWU***, explains the Bessler principle, using the two discrete pulldowns of the two opposite discrete electric fields, which compose each graviton.

Dark Matter and Energy from Two Pulldowns of Graviton on Light. Gravity is known to pull down on light. That can occur if there are two discrete pulldowns on opposite temporarily-appearing spirit matter (most fundamental opposite charges) within light. The energy provided by a graviton will cause the opposite spirit charges to remain while occupying their own new spaces. The new space is the origin of the so-called dark energy. The new matter could be called the new dark matter.

Matter Production from Obedient Spirit Matter. Sufficiently large and dense collections of the new spirit matter condense into new hydrogen in obedience to God. They don't condense into anti-hydrogen. That explains why there is so much matter in the universe rather than anti-matter. That resolves the baryon asymmetry problem.

Much Dark Obscuring Matter in Galaxies. It also explains why it is dark at night with so much dark obscuring matter out in space, thus not allowing much light from extremely far away to get here. Within galaxies there would be much production of dark obscuring matter. To be consistent with the scriptures, people

saying they have found black holes within galaxies would be advised to only claim that they have found extremely-massive dark-regions within such galaxies. Some of the verses in Abraham Chapter 3 suggest to me that the center of a galaxy (likely our Milk Way) is composed of many very great stars with much dark obscuring matter surrounding them. An interior of a giant black hole is not being described in those verses, but rather a vast stable collection of many great stars. The great stars could not be externally seen, since they are surrounded by much dark obscuring matter because of the much light, the much matter, and the much gravity. There would be similar situations for many other galaxies, which produce much new obscuring matter within, because of the presence of the much light from many bright massive stars and much gravity coming from the much matter.

Infinite Descendant Matter of Any Matter in Eternity. Because any matter is forever a source of gravity, when someone thanks me for picking up litter as a "good turn", while I am walking to or from a bus stop or I am just taking a walk, I can say to them, "When we pick up any litter, that litter will in eternity be ancestral matter to an infinite amount of new matter."

A.12 Expansion Rate of Universe Not Constant

New Space Production Highest in Galaxy Centers. If many other galaxies are like our galaxy with the production of much new obscuring matter, because of the presence of the much light and much gravity coming from the much matter, then they would also be producing much new space associated with the production of the new most fundamental matter. The new space comes during the pulldowns by the two-part gravitons of the opposite-most-fundamental-charges, which are temporarily appearing in light. New matter and new space would appear with each pulldown. Not only would the centers of galaxies be locations for the highest production of new matter but they would also be the locations for the highest production of new space. The new space would not immediately adjust itself out over vast distances. It would take time for things to spread out and adjust themselves according to the insertion of the new space. With much new space produced in galaxies, we should not be surprised that the expansion rate of the universe is not constant but is greater near the great production centers of new space. Closer to the center of our galaxy, there would be greater expansion rates of the universe.

BIBLIOGRAPHY AND NOTES

Bessler Principle or Physics

Doctrine and Covenants 93:36 6 May 1833 "The glory of God is intelligence or, in other words, light and truth."

Doctrine and Covenants 131:7 17 May 1843 "There is no such thing as immaterial matter. All spirit is matter, but it is more fine or pure, and can only be discerned by purer eyes;"

Vol. I of ***The Feynman Lectures on Physics*** (1963) by R. P. Feynman, R. B. Leighton, and M. Sands.

52nd Edition ***CRC Handbook of Chemistry and Physics*** 1971-1972, The Chemical Rubber Co.

https://gravity-wheel.neocities.org/TxtCollection.html Collection of my various text files 2001 to 2011.

24 Jul 2001 – 15 Mar 2014, see 8 htm/html + 10 JPG/jpg + 29 txt = 47 files in https://gravity-wheel.neocities.org/DateFileOrderCollection.html then click on the appropriate links associated with the desired .htm, .html, .JPG, .jpg, and .txt files.

Discussions at https://besslerwheel.com/ since 22 Nov 2003 under the name, AldenPark, where I made 79+ posts to 2023, some of them being very long. See https://besslerwheel.com/forum/ .

https://gravity-wheel.neocities.org/TxtCollection/McKinley1968.txt 3 April 2010 - Alden Park.

I began my https://gravity-wheel.neocities.org/ site on 28 Feb 2019, which site contains discussions, external active links, and some comments regarding those links. The site allows groups of up to 10 figures of an earlier 1 March 2019 .htm version (5 MB) of my over-arching book, ***Gravity-Wheel Unveiled*** to be displayed simultaneously. More figures may be simultaneously display using duplicated tabs. That would allow one to see the figures without losing track of where one is reading. My neocities site may show alternate locations where the most recent versions of my free four pdf books might be obtained, which information may especially be useful in case my blog site is down or not available.

I began my https://gravityunveiled.home.blog/ blog site on 18 Mar 2019, which site contains many things including self-publications (from my house at 922 W. Franklin Ave., Ridgecrest, CA, after retirement, not part of my US Gov. work) of my three free pdf files of my books:

Gravity-Wheel Unveiled, Alden Park, 18 Mar 2019, 712 pages.

Bessler's Little Book Decoded, Alden Park, 18 Mar 2019, 92 pages.

A Book in Every Home Decoded, Alden Park, 18 Mar 2019, 85 pages.

"My Memories of McKinley Low Friction Demonstration" spring 1968 Alden Park (pp. 139-141 ***GWU*** 18 Mar 2019).

See 133 primary GETTR posts on https://gettr.com/ under the name, @Alden_Park, which I made from July 2021 to 28 December 2023.

My blog site on or after the date 3 June 2025 of publishing of this book, ***MSEHNS***, from my home in Fresno, California, United States of America, should allow downloads of all four of my free pdf books, ***Gravity-Wheel Unveiled*** (***GWU***), ***Bessler's Little Book Decoded*** (***BLBD***), ***A Book in Every Home Decoded*** (***BEHD***), and ***Many Scientific Enigmas Have New Solutions*** (***MSEHNS***).

Many Scientific Enigmas Have New Solutions, Alden Park, 3 June 2025, 200 pages in this book.

Bessler Wheel

Apologi'sche Poësie und Poetische Apologie Von seinem MOBILE PER SE und PERPETUUM MOBILE by Johann Ernst Elias Orffyreus (pseudonym for Bessler) (1716/1717) Germany, published by Orffyreus.

Bessler's Wonderful Wheel (Article, 1956) by Frank Edwards, http://www.padrak.com/ine/BESSLER.html .

Perpetual Motion: An Ancient Mystery Solved? by John Collins, 1997, Permo Publications; PO Box 2001; Leamington Spa; CV32 6YQ; United Kingdom (UK), ISBN No. 0 9531615 0 1. https://www.lulu.com/shop/john-collins/perpetual-motion-an-ancient-mystery-solved/paperback/product-19ym8j.html?q=John+Collins&page=1&pageSize=4 .

Apologia Poetica, (also known as ***Poetica Apologia***) translated (German to English), edited, and published by John Collins, 2008, https://www.lulu.com/shop/john-collins/apologia-poetica/paperback/product-142m76.html?q=John+Collins&page=1&pageSize=4 .

Gravity-Wheel Unveiled, Alden Park, 18 Mar 2019, 712 pages. I made free pdf versions available (at https://gravityunveiled.home.blog/). "4.1 Bessler's Wheels", pp. 76-77. "6.1 Bessler's Wheel", pp. 106-110. "6.2 Bessler's Lost Wheels to Be Found", pp. 110-111. "Test Reinvented Bessler Wheels", pp. 152-153. "Bessler Wheels", p. 236. "9.1 Low Friction Orffyrean Roller Bearing", pp. 258-275. "14.1 Build Orffyrean Roller Bearing", pp. 329-332. "Return of Bessler Wheels", p. 342. "15.1 Some Past Perspectives", pp. 352-357. "Full Versions?" pp. 424-425. "APPENDIX B ORFFYREUS'S LITTLE BOOK", pp. 472-536. "Bessler Wheel", pp. 688-691.

"My Memories of McKinley Low Friction Demonstration" spring 1968 Alden Park (pp. 139-141 ***GWU*** 18 Mar 2019).

Speculation by Alden Park of Bessler's circa 1711 "strangely invigorating dream" prior to constructing Orffyrean roller bearings for his 6 Jun 1712 Gera wheel. "Bearing Formation Dream" (pp. 524-525 ***GWU*** 18 Mar 2019).

Bessler's Little Book Decoded, Alden Park, 18 Mar 2019, 92 pages. I made free pdf versions available (at https://gravityunveiled.home.blog/).

"Vision of How the Bessler Wheel Worked" 12 Jan 2000 Alden Park (pp. 689-690 ***GWU*** 18 Mar 2019).

Many Scientific Enigmas Have New Solutions, Alden Park, 3 June 2025, 200 pages in this book.

Coral Castle or Leedskalnin

Edward Leedskalnin ***A BOOK IN EVERY HOME*** 1936, Homestead, Florida, published by Edward Leedskalnin.

A BOOK IN EVERY HOME by Edward Leedskalnin, 1936, Homestead, Florida, reprinted by Coral Castle, Inc. showing STATISTICS ON THE CORAL CASTLE OF FLORIDA (http://www.coralcastle.com).

Gravity-Wheel Unveiled, Alden Park, 18 Mar 2019, 712 pages. I made free pdf versions available (at https://gravityunveiled.home.blog/). "Second Coded Book Witness of Bessler Principle", pp. 30-31. "Coral Castle", pp. 241-250. "Modified Macro Statement of Bessler or ED.L. Principle", pp. 250-251. "ED.L. Principle Proofs", pp. 251-254. "Gate Center of Balance", pp. 254-257. "9.2 Sweet Sixteen Family of Cylinders", pp. 275-279. "14.2 Build Sweet Sixteen Family of Cylinders", pp. 332-333. "Sweet ED.L. to Influence New Engines", pp. 340-341. "Sweet Sixteen

Family of Cylinders", p.443. "Sweet Eight Family of Cylinders", p. 443. "APPENDIX D ED.L.'S LITTLE BOOK", pp. 571-688. "Coral Castle", pp. 695-696.

A Book in Every Home Decoded, Alden Park, 18 Mar 2019, 85 pages. I made free pdf versions available (at https://gravityunveiled.home.blog/).

Gravity during Total Solar Eclipse

www.nobelprize.org/prizes/economic-sciences/1988/allais/biographical/ "Finally during the total eclipses of the sun on June 30, 1954, and October 22, 1959, quite analogous deviations of the plane of oscillation of the paraconical pendulum were observed."

http://prd.aps.org/abstract/PRD/v62/i4/e041101 "... implies that there may be a shielding property of gravitation." Phys. Rev. D 62, 041101(R) – Published 14 July, 2000.

https://www.newscientist.com/article/mg18424755-200-the-strange-gravitational-effect-of-eclipses/ "The strange gravitational effect of eclipses" by Govert Schilling 24 November 2004.

https://www.forbes.com/sites/jamiecartereurope/2024/06/13/gravity-waves-confirmed-for-first-time-during-solar-eclipse-say-scientists/ " 'Gravity Waves' Confirmed For First Time During Solar Eclipse, Say Scientists" Jun 13, 2024 "Researchers at Montana State University have made a significant scientific breakthrough by confirming the existence of gravity waves in Earth's stratosphere during a solar eclipse."

Miscellaneous

Lightning by Martin A. Uman McGraw (1969).

In Search of Cumorah (1981) by David A. Palmer (***SC81***).

Out of the Blue: A History of Lightning: Science, Superstition, and Amazing Stories of Survival by John S. Friedman (2008).

Revelation or Divine Method of Learning Truth

"Stand Forever" by Lawrence E. Corbridge, General Authority Seventy, January 22, 2019, https://speeches.byu.edu/talks/lawrence-e-corbridge/stand-for-ever/?M=V .

Beside Matt. 7:7, Matt. 16:13-19 (especially verse 17), and James 1:5, see also evidence of revelation from God as in Gen. 18:17; Gen. 41:39; Deut. 8:3 (Matt. 4:4); 1 Sam. 3:1; 1 Kgs. 19:12; Job 33:14; Prov. 29:18; Dan. 2:45; Matt. 11:27 (Luke 10:22); John 6:46; John 8:26; John 10:4; John 14:16-17,21,26; John 15:15; John 15:26; John 16:13; John 17:8; Acts 1:1-2; 1 Cor. 12:3; 1 Cor. 14:6; 1 Cor. 14:10; 2 Cor. 12:1; Gal. 1:12; Gal. 2:2; Eph. 1:17; Eph. 3:3; 2 Pet. 1:18; Rev. 1:1; Rev. 4:1. There are many more scriptural references related to revelation than these. One could also consider scriptures under such related topics as: Dream; God, Access to; God, Privilege of Seeing; Guidance, Divine; Inspiration; Prophecy; Reveal; Scriptures to Come Forth; Testimony; Vision.

Speculation by Alden Park of Bessler's circa 1711 "strangely invigorating dream" prior to constructing Orffyrean roller bearings for his 6 Jun 1712 Gera wheel. "Bearing Formation Dream" (pp. 524-525 ***GWU*** 18 Mar 2019).

Doctrine and Covenants 93:33 "… The elements are eternal, …"

Doctrine and Covenants 93:36 “The glory of God is intelligence or, in other words, light and truth.”

Doctrine and Covenants 131:7-8 “There is no such thing as immaterial matter. All spirit is matter, but it is more fine or pure, and can only be discerned by purer eyes; We cannot see it; but when our bodies are purified we shall see that it is all matter.”

"My Memories of McKinley Low Friction Demonstration" spring 1968 Alden Park (pp. 139-141 ***GWU*** 18 Mar 2019).

"Turn the turner." spring 1968 Alden Park (pp. 8, 246, 566, 569 ***GWU*** 18 Mar 2019).

“Vision of How the Bessler Wheel Worked” 12 Jan 2000 Alden Park (pp. 689-690 ***GWU*** 18 Mar 2019).

https://www.churchofjesuschrist.org/study/scriptures?lang=eng&platform=web .

The Holy Bible containing the Old and New Testaments translated out of the original tongues: and with the former translations diligently compared and revised, by his majesty's special command Authorized King James Version with explanatory notes and cross references to the standard works of The Church of Jesus Christ of Latter-day Saints, 1979.

The Book of Mormon: Another Testament of Jesus Christ, Published by The Church of Jesus Christ of Latter-day Saints, 1989, First English edition published in 1830, translated by Joseph Smith, Jun.

The Doctrine and Covenants of The Church Jesus Christ of Latter-day Saints, containing revelations given to Joseph Smith, the Prophet, with some additions by his successors in the Presidency of the Church, Published by The Church of Jesus Christ of Latter-day Saints, 1989.

The Pearl of Great Price, a selection from the revelations, translations, and narrations of Joseph Smith, first prophet, seer, and revelator to The Church of Jesus Christ of Latter-day Saints, Published by The Church of Jesus Christ of Latter-day Saints, 1989.

"The Everlasting Covenant" by President Russell M. Nelson, President of The Church of Jesus Christ of Latter-day Saints, https://www.churchofjesuschrist.org/study/liahona/2022/10/04-the-everlasting-covenant?lang=eng .

"If You Could Hie to Kolob" W. W. Phelps, 1792-1872, hymn #284, ***Hymns of The Church of Jesus Christ of Latter-day Saints***, 1985. Among many interesting words, the hymn contains the words, "... There is no end to matter; There is no end to space; ..." https://www.churchofjesuschrist.org/music/text/hymns/if-you-could-hie-to-kolob?lang=eng .

ABBREVIATIONS AND SYMBOLS

°	degree(s)
*	multiplication within a formula or equation
24-7	24 hours per day, seven days per week
B.C.	before Christ
BEC	Bose-Einstein condensation
BEH	***A Book in Every Home*** Edward Leedskalnin, 1936
BEHD	***A Book in Every Home Decoded*** by Alden Park, 2019
BLBD	***Bessler's Little Book Decoded*** by Alden Park, 2019
c	speed of light = (frequency of light)*(wavelength of light)
C	Celsius
CANR	Chemically Assisted Nuclear Reactions
CRC	52nd ***CRC Handbook of Chemistry and Physics***, 1971-1972
CRS	compressed-rotational-shielded
D	Distance from earth to the sun
ED.L.	Edward Leedskalnin
ED.L.	Energy from Delayed Leveraging by gravity
FILO	first-in last-out
Fig.	Figure
Figs.	Figures
g	acceleration due to gravity
GANE	Gravity Assisted Nuclear Effects
GWU	***Gravity-Wheel Unveiled*** Alden Park 2019
IE	***Infinite Energy***
h	Planck's constant = $6.626*10^{-34}$Joules seconds
H	height
Jr.	Junior
K	Kelvin
LENR	Low Energy Nuclear Reactions
M	mass
MHz	mega Hz or million Hertz or million cycles/second
mpg	miles per gallon
mph	miles per hour
MSEHNS	***Many Scientific Enigmas Have New Solutions*** Alden Park, 2025
n	neutron
P	momentum

p	proton
p.	page
PM97	***Perpetual Motion: An Ancient Mystery Solved?*** John Collins, 1997
pp.	pages
s	radius of sun
sn	direction of central rod from its magnetic south to north
T	average temperature
URL	Universal Resource Locator
V	velocity
ω	angular velocity

INDEX

D

E

F

G

H

R

S

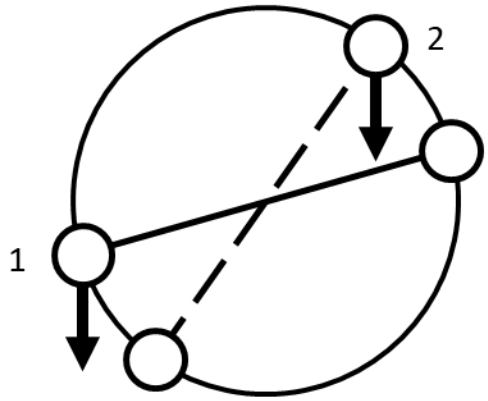
T

U

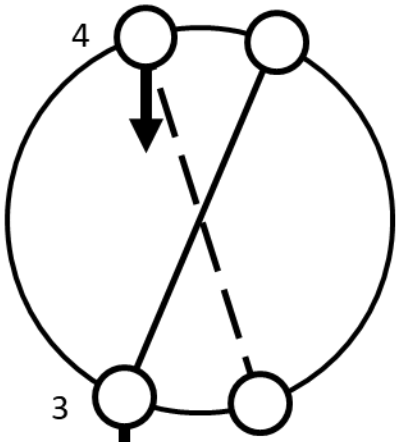
V

W

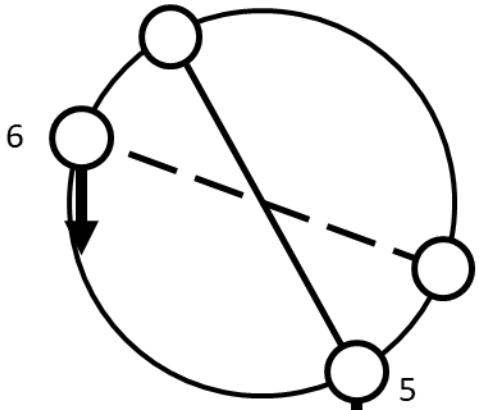
Y



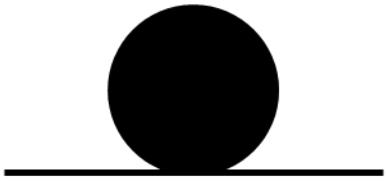
CCW: TWO PULLS DOWN



CCW: TWO PULLS DOWN



CCW: TWO PULLS DOWN



OLMECS ROLLED MASSIVE STONES

ROLLING WITHOUT SLIPPING

LOW-FRICTION ORFFYREAN STEEL-ROLLER-BEARING