For the Grandkids:

In the Beginning

The Autobiography of

Robert ML Baker jr

September 25, 2022

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CHAPTER 1

In the beginning

Autobiographies are like the Johnny Mercer song "You've got to accentuate the positive, eliminate the negative, latch on to the affirmative and don't mess with Mister In-Between…" I will try and avoid that path and tell it as it was … or at least as I remember it was – the good times and the bad. By the way, what follows is not necessarily chronological. As Einstein has proclaimed: "time is relative…" … so one thing does not necessarily follow another time wise. Paraphrasing Emerson "The foolish adherence to a chronological sequence is the Hobgoblin of little minds." – keeping that in mind, please bear with me during my conversation with you about my life!

So how did I begin? As Charles Dickens wrote "**It was the best of times, it was the worst of times**,…" at least for my Mom and Dad from 1920 to 1930 …The roaring 20's for My Dad as he worked his way through Berkeley playing drums on weekends for Horace Heidt's "Musical Knights" and Mom at LA Hi and then at UCLA's old Vermont Campus – but Hitler was rising in the new Nazi Party and the World was headed for War. Then early on Labor Day morning, September first, 1930 arrived Robert M L Baker, Jr.

First memories:

My folks did not have money for a house or even an apartment, so they lived with my grandparents, Ethel and Ira Harlan, in their home on Crenshaw Boulevard in LA. My first recollection was my father out in the cold rain fixing the window behind my little bed. I held that cherished vision of my sweet father taking care of his darling little boy "Bobbie." Years later Mom dashed my loving memory. Seems that I was bawling and disturbed my Dad's SC law school studies, so he tossed a law book at

me to shut me up – broke the window by my bed instead and Mom insisted he fix it immediately in the rainstorm so "Little Bobbie would be dry and comfy!"

I remember my first day at Kindergarten – MY MOTHER LEFT ME!! My God what a tragic scene – I remember straining; fingers clinging to the chain-link fence where my mom had deposited me in the sandbox concentration camp – perhaps one of my worst days.

I was a sickly child, was behind a year in school. Some thought I was precocious because I authored a Book when I was six – not exactly! I wanted some neighborhood kids to visit me while I was ill – by a back window in my grandparent's home so other kids would not catch whatever I had. My babysitter was practicing her shorthand, so I would walk around my sick bed and dictate a story I called it "The Kiddish Country." It was about Kevin and Roger who had adventures on a wonderful, magic island located at latitude and longitude zero– in retrospect my story was a lot like "The Wizard of OZ," that I was reading at the time – anyway I learned the "hanging chapter end" in order that my little audience would return to my window the next day. For example: "So many ways to kill Kevin in so much time and now the hungry Jaguar was poised to devour Kevin, when … "to *be continued*.

One day I was in the backyard playing, when I saw my grandma Harlan fall down our back stairs: "grandma, grandma – are you OK?" I screamed. She replied: "I will be Bobbie as soon as you get off my stomach!" I loved Grandma!

I also liked reading "Huckleberry Finn." So, one day, having had enough of my mom and dad, I set off with a knapsack on a stick over my shoulder – packed with cheese, cookies and rolls (still my favorite!). Got as far as a block away (Washington Boulevard) – not far, but daughter Robin ran away from our Tuscany "Palace" with similar provisions – plus some dresses on hangers -- she only got as far as our side yard garbage cans – not quite as adventurous as her father, I guess.

The neighbors:

On one side lived "odd" Felix and his also peculiar Mother. He was of Indian heritage (pardon me, I meant "Native American"). He would stand in his backyard spinning a rope – a lasso. He tried to perform like the famous Will Rogers (for example, Will would say while twirling rope: "Make crime pay – become an attorney!"). Then beyond our back fence lived a Black family (pardon me again, I meant "African-American"). They were really nice – I believe he was an attorney like my Dad was studying to be. Not that my grandparents were in a "poor"

neighborhood – just a "multi-cultural" one (I think that my choice of words is correct here?).

Looking out my little bedroom window at the traffic racing by on Crenshaw Boulevard, I often wondered: "Would I ever be brave enough to drive so very fast?" Probably not! I thought. Then I would wonder: "What is at the unseen end of Crenshaw Boulevard – hidden from me far, far away?" and "Why are the cars surging back and forth from that mysterious unseen horizon?" That was the beginning of my interest in *science*. At its roots *Science* is based on *Curiosity*, albeit well-organized, classified knowledge-based *Curiosity*.

Airplanes:

On some Sundays we would drive to watch airplanes take off from the International Airport. Not LAX back then, but the Grand Central Airport in Glendale (much later on, I would work there at the initial headquarters of *Aeronutronic, Philco-Ford*). I especially enjoyed aircraft stunts. One such stunt involved bi-planes with two pairs of wings one above the other connected by struts - biplanes. A daredevil "wing-walker" would emerge from a cockpit on the aircraft while in flight and walk along the wing. Called to mind here are two airplane- related rules of life: The wing walker's credo: *Don't let go of one thing until you have a hold of another.* A second rule: *You cannot do anything about the runway behind you so don't worry about it!*

We are moving!

In about 1937, the most remarkable and unprecedented things occurred: WE WERE BUILDING A HOUSE AND MOVING IN TO IT!! Was I expected to move out of my sacred bedroom and away from Grandma Harlan? GOOD GRIEF!!

CHAPTER 2

Our new home

To me change is NOT exciting -- it is a difficult and challenging experience and what can be a bigger change than being transplanted to new foreign soil?

I must admit that I was instrumental in selecting the Lot. It was pie-shaped on a corner and … most importantly ... there was a fire hydrant on that corner – I insisted on fire safety!

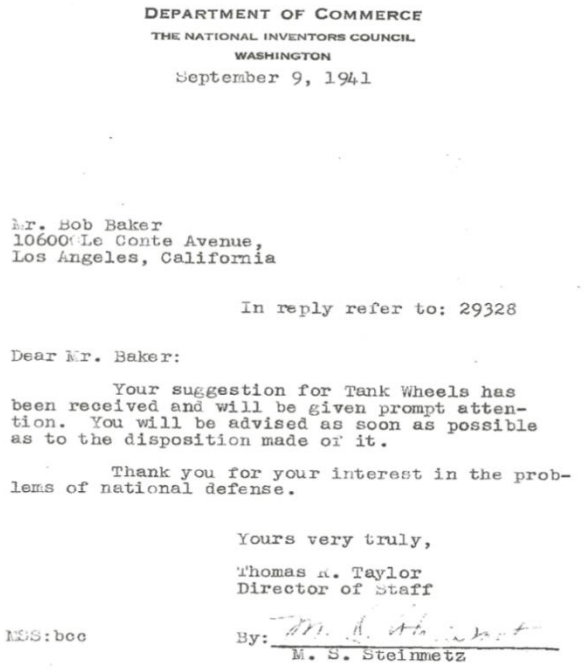
School Days:

First things first: I was enrolled in the UCLA Elementary-Training School (UES). It was for teacher training and taught "Progressive Education." Later I learned this was akin to very Liberal, Social Justice – almost Socialistic training, which now I abhor, but then it only meant if I liked math I took lots of math and if I did not like spelling I did not need to study spelling – kind of laissez-faire, which I desired at the time. My awful spelling now suggests that I made a very unwise decision. Then there were the TESTS! Because "Progressive Education" was some kind of an "experiment" we all had to take IQ Tests every 6 months. Well, after answering "What follows after 1, 1/4, 1/9, 1/16?" several times, I was able to, as they say, game the system. So I wound up with an IQ of 164. A joke, but I never want to take an IQ test again since I am sure this was my lifetime best!

Guess what? I was now bicycling to school – walking was for little kids. And even more amazing, I bicycled with a new friend. His name was "RJ" Wagner – later to become a famous movie star, Robert Wagner! His family lived in Bel Air – I think on Chalon Road. I was about 10 or 11 years of age; RJ would bicycle down to our place in Westwood and we would ride together to the UES. I could not see the value in the pictures of nude girls RJ carried in his bike's handlebar basket -- UNTIL LATER I must add! Subsequently, more on RJ.

My first invention:

If only I wasn't so little … I had a great idea to expedite our victory in World War II: our tanks could not move very fast on regular roads – wouldn't General Patton have loved to move his tanks 60 or 70 mph to confront the Nazis more quickly? So why not mount our tanks on retractable heavy duty aircraft landing gears – when they were deployed, high road speeds could be achieved! Initially, the government liked the idea:



DEPARTMENT OF COMMERCE
THE NATIONAL INVENTORS COUNCIL
WASHINGTON
September 9, 1941

Mr. Bob Baker
10600 Le Conte Avenue,
Los Angeles, California

In reply refer to: 29328

Dear Mr. Baker:

Your suggestion for Tank Wheels has been received and will be given prompt attention. You will be advised as soon as possible as to the disposition made or it.

Thank you for your interest in the problems of national defense.

Yours very truly,

Thomas A. Taylor
Director of Staff

MSS:bcc

By: M. S. Steinmetz

I even received a phone call suggesting that my concept be tested at Aberdeen Proving ground! Then the hammer fell – they found out I had just turned 11 years old – no place for children.

Here comes the fun part: **the day I was expelled from Emerson Junior High School.** Now I was in a "real school." We even had Paper Drives to help the underprivileged! Richard Wright and I worked together to collect newspapers. But that night we also were invited to view the cosmos with an amateur astronomer in our neighborhood – the viewing was to commence at 6:00 pm sharp. But Richard and I had not yet collected 25 pounds in each of our paper bundles for the drive. Well, being "innovative" we put a few bricks in any underweight bundle (about three of the dozen bundles we had collected). Next day as workers loaded the paper bundles into a truck one of the bricks fell out. Oh! Oh! Turns out the lose-brick bundle included a newspaper having Richard Wright's address on it. Crying and

under great emotional strain I stepped forward and stated that I worked with Richard and shared responsibility for the crime. Emerson's Principal summarily expelled us that afternoon for the day. We were mortified, ashamed beyond belief! As we set off for home on foot, we passed Saint Albans Catholic Church. Although neither of us were Catholic, at this point both of us needed divine intervention – how on earth are we going to face our parents for one thing? The Catholic Father immediately realized we were not Catholic, nevertheless he saw our despair. Said he understood "how terribly we had sinned!" OK, OK we got that – but **Hallelujah! Hallelujah!** He volunteered to phone our parents. He told our folks we were repentant and were at a loss how to face up to them. Boy did that work! At home we were both hugged and consoled in our sorrow!

Another of my new friends was John Miller, – big athlete, BMOC (Big Man On Campus) and fellow member of the honorary Emerson Junior High School *Squires* – we had sashes festooned with official school symbols and were responsible for raising the American Flag in the morning and were enrolled in the Honor Homeroom (by the way, many of the Mexican girls in the Honor Homeroom had knives rolled up in their hair – even back then we needed personal protection!).

How I learned about institutional respect: One day John and I had a dispute – to this day I do not remember what it was about, but it was "serious." We met in an empty hallway – no witnesses. John suggested that we did not want to lose any public respect for Emerson Junior High School and so we carefully folded our Squire Sashes and gingerly placed them on a window ledge. We then faced off and John beat the "crap" out of me! Oh Well, it was a lesson in respect well learned. As a *Squire* I also had the responsibility at Noon to start the kickball game. Ordinarily there were eleven boys at each end of the field. This day I looked to my right: Lined up were over 50 *Pacheco's*, a fierce Mexican American Gang. I looked to my left: Lined up were over 50 *Suite-suitors*, a fierce African American Gang. Well, I figured out what was going to happen – so I blew my little whistle, dropped the game ball, and ran the whole way home (over 20 blocks). Next day the *LA Times* the front-page story blared out "**Race Riot at Emerson Junior High School, hundreds hurt!"** No mention of "Bobby Baker started it!" Except for the above listed hiccups, I, having acknowledged that I was a Nerd, had started to assimilate with the "ordinary" non-nerd students. So the timing was way wrong when my parents decided **not** to have me go to *Uni Hi* with the rest of my school mates after *Emerson*, but to *HARVARD (MILITARY) HIGH SCHOOL!*

Wow! What on Earth caused this new educational plan? Since birth whenever I disagreed with my folks (lots of times) I was summarily ordered "YOU ARE BEING ARGUMENTATIVE AND YOU ARE TO IMMEDIATELY GO TO YOUR

ROOM!!!" Therefore, to protest was useless. As I learned later the motivation was not educational it was social. My Dad was trying to promote his law business (he had been forced by Grandfather Baker to continue in grandpa's firm even though Dad had done outstanding work at SC Law and had to turn down some very lucrative law-firm offers to stay with his father). My presence at *Harvard (Military) High School* was believed to be key to promoting Dad's business as was Mom's social activates at the *Assistance League, Nine O'clock Players*, *House Ear Institute,* Mrs. Duque's *Children's Hospital* and other eleemosynary activities. I must admit that I learned something at *Harvard High School* that I never would have learned at *Uni Hi.* My classmates included David O. Selznick's Son (Produced "Gone with the Wind"), Malcom and Jim Douglas (Douglas Aircraft Company), Dickey Zanuck (his Dad was the founder of *20th Century Fox*), a year or so younger though and numerous other children of captains of industry, especially the movie industry. Out of over 50 classmates only David Toy and I did not make Officer – I am convinced that what really set us apart was that out of the 50 we did not have well to do and/or influential parents – we were unique! Each year at Graduation a *Mathematics Prize* is given to the graduate who has the best grade record in mathematics and the sciences. The year of my graduation I was so far ahead in grades in math and science that I was really the only qualified contender – what should the school do? None of the "anointed" graduates were, therefore, eligible for the Prize – I learned later that several of the influential parents had insisted that because of the new National interest in math and science ("The Space Race") they insisted that their child be awarded the *Mathematics Prize*. The only option left for *Harvard High School* was to do away with the Prize this year, which they did! What an excellent lesson I learned on the fact that not always does the best one wins the race! The Harvard Annual for my class of '49 was prophetic and showed a comic drawing of me atop a rocket, drawn by fellow student Don Webber. Also, of great note another classmate, David Hull, wrote on my Highschool Annual page "I love you Bob" and that mutual affection has remained for at least seven decades – at a non-sexual level certainly! David's wife, Penee Conlee Hull, volunteered to edit (except for my affection concerning capital letters) this writing and for that I am most appreciative.

Actually, besides that lesson of the lost prize, I profited by being able to meet some most interesting people at *Harvard High School*: I had breakfasted several times with Donald Douglas when I dropped by school-mate Jim Douglas's' home on San Vicente in Santa Monica. He told me how he started Douglas Aircraft Company in a Garage in Santa Monica. I dated Darilyn Zanuck – I'll always remember riding with her into *Twentieth Century Fox* on Pico in her white Rolls Royce Convertible "Good morning, Miss Zanuck – what can we do for you today!" I had good conversations with Mr. Zanuck when he would host parties for Darilyn at their Beach

House in Santa Monica. “Bob, never pay any attention to the lower third of a movie screen – nothing important happens down there.” Walt Disney’s daughter “Dis” was in our group. I would talk to Mr. Disney at his home. He would show us around his “Backyard” where he had installed a narrow-gauge railroad! ” Don’t ask me what it cost me to build a trestle over my wife’s rose garden so my train wouldn’t disturb it!” I gained lots of insights into the “Rich and Famous”!

***In a little more detail, especially as to their politics*:**

Donald Douglas: His son, Jim, and I often did chemistry experiments in the 1940s and early 1950s in his backyard bomb shelter (we would use a drill press as a centrifuge in the shelter and then hide outside in case it would break and harm us). I often had breakfast with Mr. Douglas Senior, and we chatted about all kinds of things – He started out in a garage in Santa Monica -- he was from a very poor family and lived in a Santa Monica “shack”– he and his pals worked night and day on the DC-1 and in the 1930s it ballooned into *Douglas Aircraft Company*. Of interest to us both was his take on Politics. He said that he was a “Died in the Wool Democrat” – I asked why? “World War I Democrat Woodrow Wilson was in charge, World War II Democrat FDR was President, and now the beginning of the Korean “war” Harry S. Truman was President. So the Democrats are the “Party of War” and *Douglas Aircraft Company* prospers during war – so I am a Democrat!” Right or wrong that was Mr. Douglas’s perception. He was also an inventor. At breakfast he would push a button and his morning paper would automatically turn to the next page! He told me that now he learned a lesson to hire others, especially highly educated Engineers, technicians, secretarial assistants, *et al.* “… resist the urge to do such tasks yourself… always use others, usually more proficient than you, to do everything – never do it yourself!”

Walt Disney: I knew his daughter “Dis” and chatted with him many times. He told me that when he started out, he was a hard-working cartoonist – very little money. He and his brother Roy started out on animated films in a little back office in LA that rented for $10 a month. They worked day and night, and it grew to *Disney Productions*. He said his dad was a Socialist and he usually voted Democrat. Like Mr. Douglas he always utilized others more proficient, to do his work “Do you think I drew all those cartoon figures? -- No! Always delegate!”

Darryl Zanuck: As I stated I dated his daughter, Darilyn Zanuck. He formed *Twentieth Century Fox i*n 1935 and was an Oscar winner. Why did I have dates with these two famous girls? Because of their fathers they may have been famous, but not super good looking, so they did not have many dates – they were smart, so I enjoyed dates with them. Darilyn invited me often to their beach home near Sorrento on the

Santa Monica beach. I would talk to Mr. Zanuck for hours. He had been abandoned since he was 13 years old and joined the US Army "… just to eat." He survived with a series of jobs -- While pursuing a career as a writer, he worked in a garment factory, was a professional boxer, steel worker, odd jobs. He said he was a hard-working survivor – never quit! Got his start finally with the "Rin Tin Tin" series of police-dog movies for *Warner Brothers*. Never found out his politics, but he gave me some advice: Do **not** look for handouts, just work as hard as you can from "dawn to dusk and you will make it! "Like Donald Douglas and Walt Disney, he always "delegated: "Never do anything that can be done others possibly more skilled than you" There is a recurrent them here. All great *discoverers I and captains of Industry* seem to **delegate*!*** Even Ponce se De Leon

Now I am ready for a university.

CHAPTER 3

University Days

Where to go? I was interested in science in general and "Rocket Science" since I was about 12. Back then the folks rented a small room near our kitchen to a UCLA graduate student – I think his name was Bill – anyway he was knowledgeable in "atomic theory" and "Rockets." Wow! I had questions and he had answers and he whetted my intellectual appetite even more. As I already noted The *Harvard High-School* Graduation Yearbook even cartooned me on top of a Rocket! So, I wanted a University that had a reputation in "Rocket Science." There were four in 1949: *Yale* (Professor Brouwer), *UCLA* (Professor Herrick), *Cal Tech* (lots of faculty) and *Stanford* (Professor Breakwell). I was accepted to all of them including *Stanford* (Mom thought it was the "proper" place to go). I had worked during High School (*Harvard Military*) as a salesman ("sales kid") at a Men's Store *Phelps Terkel* located on Wilshire Boulevard on the "Miracle Mile". Not a good fit! Ask anyone – I am not a "Fashion Plate" my best outfit is a sweatshirt and Levies, so would I say, "That coat and tie look simply fabulous on you, but the pants are a bit tight"? Not really! I worked to help my folks pay for *Harvard High School*, so I knew they did not have the money for any school but UCLA. Also, it was just down the street from our home at 10600 Le Conte and I had free room and board. BUT, best of all, a famous Professor Samuel Herrick offered an undergraduate course at UCLA on "Rocket Navigation." Just what the doctor ordered! Professor Herrick was an exceptional professor and coined the name "Astrodynamics" to identify the field of Celestial Mechanics as applied to Aerospace. The following email, sent to Fred Hameetman and the equally famous astronomer and Nobel-Prize winner Professor Kip Thorne (*Caltech*) on February 18, 2021, chronicled a particular incident I recall concerning Professor Herrick:

From: Robert Baker [mailto:drrobertbakerjr@gmail.com]
Sent: Thursday, March 18, 2021 11:28 AM
To: 'Fred Hameetman'; 'Kip Thorne'
Cc: drrobertbaker@gravwave.com
Subject: RE: Interstellar

"Hi,

"This movie that Kip discusses was great!

"I recall a 1951 sci-fi movie that also generated new scientific content. It was "The Day the Earth Stood Still" by *20th Century Fox*. It portrayed a visit by an alien, Klaatu (Michael Rennie), who lands and tells the people of Earth that they must live peacefully or be destroyed as a danger to other planets. OK after he lands in his spaceship he goes to a famous scientist's home and finds the professor's blackboard, filled with equations to solve a three-body Astrodynamics problem. Klaatu enters and adds a key mathematical equation to solve it. Well to add realism, the film's Director contacted my Professor Samuel Herrick of UCLA's Astronomy Department to put those equations on the blackboard! Herrick took our whole UCLA-Astronomy-class students to view the movie in Westwood Village. Much to the amazement of the other movie viewers, when the equation-filled blackboard appeared on the screen our whole class stood up and applauded wildly! The point here was that a Professor Dirk Brouwer from Yale also viewed the movie when it came to his town – and he looked at the equations on the blackboard – and figured out another way to solve them and, I think, published a journal article on his solution!"

"Science marches on" even in the movies!"

Bob

ORIGINAL LETTER FROM FRED HAMEETMAN:

"**From:** Fred Hameetman [mailto:fredh@calamerican.com]
Sent: Wednesday, March 17, 2021 12:19 PM
To: Kip Thorne
Subject: Interstellar

"--It's not hard to find a sci-fi movie that has influenced somebody to grow up and pursue a career in science, but it's a bit of a bigger challenge to find a sci-fi movie that generated new scientific content during production.

"In the case of the sci-fi film *Interstellar*, a film that follows a group of future astronauts who set out through a wormhole in a bid to save humanity, director Christopher Nolan insisted on a realistic wormhole and supermassive rotating black hole. So realistic, in fact, that theoretical physicist Kip Thorne was brought on as an adviser and a team of 30 people led by special effects supervisor Paul Franklin was tasked with creating ultra-realistic CGI models of both.

"The end result were computer models that depicted the wormhole and supermassive rotating black hole with such detail and accuracy that it took over 100 hours to generate single frames for some of it and the total data created for the simulated pair weighed in at 800 terabytes.

"Work done by the team using existing scientific research and equations under the guidance of Thorne was so good, in fact, that actual scientists studied their model and published three different scientific papers about the effects of gravitational lensing and accretion disks surrounding black holes based on the insights gained from doing so."

####

"*Oh, the liquor was spilled on the bar-room floor and the Bar was closed for the night.*

When out of a corner a little mouse crept into the cold moon-light night.

He lapped up the liquor on the bar-room floor and on his haunches, he sat

And all through the night you could hear him cry: 'BRING ON THE GOD-DAMN CAT!'."

… A song we sang at the Phi Kappa Psi Fraternity. Mom knew a Mrs. Shoemaker and a Mrs. Inman who both told her it was the very best fraternity at UCLA and "You must have your son join!"! So, following Mom's "advice" as usual, Jack Shoemaker took me under his wing as a current Phi Psi member and Mike Inman became a Pledge Brother of mine. I met some fabulous older Fraternity Brothers: Milo Bekins and Jerry Nelson. One interesting story: In my junior year, Jack came to me and said: "My girlfriend, Louise Coleman, is a Homecoming Princess, but I am far too sick to escort her in the Homecoming Parade on Game Day. So could you stand in for me?" I said "OK." What a Day! Twice around the LA Coliseum with beautiful Princesses waving with me! Let's go around a third time! Turns out to have been the *second* most exciting parade I had ever experienced!

My Mother's promotional efforts for my dad were a great success – paid "… off in spades" she commented to Dad. The years 1920 to 1930 may have been the nadir of my dad's career, but 1950 to 1960 was the zenith! Dad was well received by many

of the wealthy in LA. At Dad's Office, 510 West 6th Street, one day, he pulled out a file drawer to show me "Bobbie, in this drawer are many million dollars of wills to probate – my future to retirement!" I looked at it and wondered if I would ever see that kind of money again? Well, I never did! Dad and Mom were very giving with the money. Dad said "… I am making money hand over fist!" Ultimately, trips, braces and education for our kids – he even increased the monthly stipend help his Dad (my Grandpa, Mel J. Baker) to over $500.00/month a lot of money back then!

Meanwhile at UCLA I was having a great time –I was actually a BMOC (Big Man On Campus) – Head of the Rally Committee (provided members with ribbons that said "OFFICIAL" and instantly changed their personality), President of the UCLA Chapter of the YMCA, Manager for the UCLA Yearbook '"*The Southern Campus*" -- Campaign Manager for Marty Rosen and June Tanner to be elected Student Body President and Vice President. They were "non-Orgs" – not in Fraternity or Sorority – first Jews to be elected as UCLA's President and Vice President – "quite an achievement" my Phi Psi Bothers acknowledged! Marty and I vowed to remain good friends "forever" and we have (an outing we had in San Francisco one time was amazing – another funny story – at least the cab driver was "over the top" with his cigar!) I was a "Kirchhoff Commando" (Kirchhoff Hall was the HQ of student government) along with Dave Lund, Gerry Hall (dated Carol Burnett a famous comedian), Marcia Tucker (my boss at "*The Southern Campus*") and Irv Goldring. To cap it off, I was appointed to the UCLA Student Executive Council. We were in charge of the whole Associated Students of UCLA (ASUCLA), organization and approved the budgets for the athletic teams, the Book Store, student cafeteria and various student projects. ASUCLA was having financial difficulties, so we cut everything: no new tennis balls for the Tennis team, no new helmets for the UCLA Football team, etc. – BUT at our last session before adjournment, a motion was made to "Provide $200 for Gold Rings for each member commemorating our service on the Council" – it passed UNANIMOUSLY – I keep the ring (now worn out) just to remind me of "Politics."

Now comes the fun part (again)! **The day I was expelled from The University of California at Los Angeles.** We had a great coach, Red Sanders – although probably a moral degenerate he led UCLA football to win after win. One win was when UCLA beat Stanford **72 to nothing!** At the corner of Wilshire and Westwood Boulevard we had a giant Rally, our Victory Bell rang out! We drank beer and toasted "The Day we beat the ---- out of those spoiled brats at Stanford!" Well, I was enrolled in AFROTC and had a class that afternoon. I went into class clutching an emptied bottle of beer – I am NOT athletic, but this day I was able to toss the empty beer bottle cleanly from my seat directly out an open class window (maybe 30 feet or more away) without hitting anything or any student! Well, the Air Force Major

Instructor was able to reconstruct the bottle's trajectory precisely and established that I was the launch site. He ordered me out of class to the Student Body Vice-Principal, Barney Atkinson's Office. Since, as I mentioned, I was a BMOC, and I knew Barney well. "Well Bob, I see you were drinking on Campus." I started to blurt out that I was only carrying an empty bottle of beer on campus, but thought discretion was the better part of valor and had better keep my mouth shut. Barney said that he had no choice but to kick me out of UCLA for the afternoon – I could tell by his smile that he took great pleasure in this pronouncement. Years later, as a UCLA Assistant Professor, I was in the on-campus Faculty Center. Barney was acting bartender for the Professors. I approached the Bar and exclaimed "Well, Barney, perhaps you don't remember your admonishment to me a few years ago when you declared that there was absolutely no drinking on this UCLA Campus." He replied with the famous statement: "That was then, and this is now." How profound a declaration! Again, a reminder to me of "Politics" or rather "Political Correctness." By the way, as an Assistant Professor I began to appreciate the inefficiency of the university educational enterprise. All faculty needed to have their teaching course schedule approved by the Department Dean. "Here is my course schedule. I am planning to teach 12 units." "Dr. Baker, I can only approve 6 units." "Why Dean, last term I taught 9 units, and my student evaluations were good, I served on departmental committees and brought in an Air Force contract funding for the Department!" "Yes Bob, your teaching duties for our department are very well accomplished and your student evaluations were tops, but the rest of the faculty teaches at most 6 units and we do not want to make them look bad do we? Also, Bob, the *Faculty Senate* suggests 6 units." We settled on 9 units again! By the way, one key to the effectiveness of my lectures was my giving a "pop quiz" every Friday. My students were not threatened by them since I carefully explained: "These quizzes are not to be utilized by me to determine your course grade! No, they are to grade ME. If most of you do poorly on the pop quiz, then I have not done my job, so I must improve my lecturing. If only one or two of you do poorly, then I want to have them make a Saturday appointment with me so that I can clarify the material they missed in my lectures that week."

It was during the Vietnam War, when some violent protestors were attempting to close down universities. I was teaching an elementary course, Physics 1A. It was a general course in which many UCLA athletes were enrolled. One afternoon a group of wild demonstrators started banging at my classroom door. "Shut down your damn class right now!!" They shouted at me. Unbeknownst to me two UCLA linemen from my class were behind me. One was a tackle known as "growling Charlie Dowd: "Get the Hell out of here right now or we will beat the grap out of you Socialists—we want to hear Dr. Baker!" My greatest teaching moment!! Charlie Dowd was one

of the toughest lineman UCLA had that year (under coach "red" Sanders) and certainly those protesting students did not want to mess with him! Now I began to figure "higher Education" and their students out! Everything needed improvement!

At the end of the AFROTC program at UCLA we had to undergo BASIC TRAINING! It was a summer at March Air Force Base. By the way that was the same Base that my folks brought me to on December 6th before the December 7th, 1941, Pearl Harbor attack! We were invited by a family friend, Major Truman Landon who led a flight of B-17s "Flying Fortresses" via Hawaii to the Philippines-- they never made it! Inside the bomber I ask one of the Airmen – "Are those belts filled with live ammunitions?" "Yep, all nine yards# of 50 caliber ammo – we use them all up for target practice on the way to Hawaii." And so they did and when they met the Japanese Zeros swarming the Pearl Harbor and Hickam Field skies they had nary a bullet to hit them with. The brave Major Landon piloted his lead Bomber directly at one Zero, hitting it with his wing tip and knocking it out of the skies! Major Landon rose to a four-star General during the War. Another four-star General I knew quite well was Tom Ryan. Tom rose from enlisted ranks to full, 4-star General – like Landon a terrific warrior! We have continued to have great fun with Tom and his wife Penny – Tom really knows how to make a great Martini (a dash of Scotch I think is the secret).

#That's where the term "Give them the whole nine yards!" came from. It meant shoot every single bullet you have at them!

Now back to BASIC TRAINING. I met one of my best friends during that ordeal – Al Barry. He was running guard for USC, later was with the LA Rams and the Green Bay Packers also my Insurance Agent. Super strong guy and just the friend you want in the military! – A "Gentle Giant" – my "cubical mate" in our two-story Barracks. Each Friday we had bunk inspection – I hated making my bunk – must be tight and perfect! (Still don't like making beds.) Each Friday prior to inspection I would go up to the floor above. They were all Mormons and **PERFECT** people. Each Friday prior to inspection, I would go to a different cubical and say: "You make the most perfect bed! Square corners, tight blanket – perfectly fluffed pillow – Wow! Could you come down to my cubical and show me how you do it?" I never had to make my own bunk and, best of all, at the end of our training I received the award for "Best Bed"!

Then there was Headley B. (don't want to embarrass anyone so let's just call him Headley B.) Really a great looking guy – reminded me of RJ Wagner. On weekends we would all head up to Lake Arrowhead for R&R. There was a cute girl at a Hot Dog stand there. Headley romanced her (he told us he "had his way with her"). At the end of our training, we had a ceremony in which we were awarded our 2nd

Lieutenant Bars. Girlfriends were allowed to "pin them on" if requested. Headley was getting married at the end of basic training in LA and requested that his fiancé pin on his Bars! I suggested to Al that we also invite the "Hot Dog" girl to pin on his Bars. At the ceremony Headley looked out at the audience. There was his perfectly groomed, Beverly Hills fiancé. Down the other way was the very sexy little "Hot Dog" girl -- both eager to pin on Headley's Bars, but not aware of each other! Headley gasped – broke ranks, headed to his Barracks to hide (later he told the Base Commander that "… I was sick to my stomach!") I do not believe that Headley ever forgave Al and me.

More on Girls:

I did date a Junior Prom Queen, Nancy F. Until at least when I exclaimed to one of my Fraternity Brothers "Boy, wouldn't it be great marry a girl like that who will always be a beauty!" He chilled my fervor for Nancy by stating "Yes, but have you looked at her mother?" – Not in any way a Beauty! Another time I was with a group partying at Corona del Mar. There was a little cave there with a fire going. I flirted with a girl there and asked her to a fraternity party. Upon coming out of the cave I told one of my pals about my new date. He exclaimed: "Bob have you ever seen her in the light?!?!" Like Nancy's Mom when illuminated she was not in any way a Beauty! Then there was Pat Fox. Until I met Bonnie, I thought she had best personality I had ever seen and was an attractive Blond. Her Dad, Dr. Fox, was the Head of the *Punahou School* in Hawaii. Pat, however, was certainly not chip off her dad's wood block – she was WILD! A member of the Delta Gamma Sorority she was expelled (like me?) for repeatedly not obeying curfew and put in Hershey Hall (actually, a much-disciplined Dorm for undisciplined UCLA girl students – no dating!). I would throw rocks at her Dorm window, and she would crawl out the window for dates. Once a good-friend and Fraternity Brother, Paul Merrifield, Pat Fox and I were preparing a punch for an upcoming party. (As an aside, Paul became my second in command at the *Lockheed Astrodynamics Research Center* or LARC and my Best Man at my marriage to Bonnie.) Pursuant to my deep interest in science and especially in experiments and data analyses, we used the loft above our Garage as a laboratory. It also contained my *Atom Smasher* – a Van de Graaff -Generator that I had construct at home for *Harvard High School* (see Chapter 5). When operated professionally, its purpose was to accelerate nuclear particles using a half-million-volt electrical field that it generated. Periodically, I would host an "*Atom Smasher* Party" where we would rev it up and the strong electrical field would often cause our cat, "Snowball," to literally climb across the Garage ceiling with her hair straight out. Also, it would usually knock out all the neighborhood TVs. For this new Experiment I "acquired" pipets from the UCLA Chemistry Department: one for

vodka, one for rum, one for gin – others for orange juice, pineapple juice, grapefruit juice, etc. Paul and I carefully measured out beakers of the various fluid mixtures and Pat Fox would write down the proportions and for each sample in a Lab Book. Paul, Pat and I would drink the concoctions (somewhat like Dr. Jekyll) and Pat would note our evaluations in the Laboratory Book. We industriously worked into the evening. Somehow, we lost track of the time and the next thing we knew was that we had all three "gone to sleep" on the Garage Loft floor and it was now morning! OK, we quickly checked out Pat's Laboratory Notes – all carefully written except for the last entry in which she only inscribed/scribbled a long wavy line from the top to the bottom of the Lab Book. Must have been when we all "went to sleep" a euphemism for "passed out."

Van de Graaff Generator "Atom Smasher"

A fast worker:

After all these years – guess who I ran into? "Hi, RJ, what are you doing at the Bel Air Bay Club?"—my old UES pal. It was way before the Club remodeled and there was a Bar just before the northernmost string of cabanas. A young girl tended the bar there and I invited RJ to have a cocktail. I left for no more than 10 minutes to visit the toilet and when I returned, RJ had disappeared AND SO HAD THE GIRL BARKEEP! The bar patrons were complaining about there being no bar service –

well, I found out that in *less than 10 minutes* Robert Wagner had seduced the pretty barkeep girl down in one of the adjoining cabanas – a record, I think.

The *Bel Air Bay Club* (BABC) had played a big part in the life of the Baker's, so I will digress. We joined the BABC in 1938, but the first recollection I had was laying on the walkway near the just mentioned northernmost Bar (also a Bridge-playing site). On top of me – sitting on my stomach (much like I had sat on Grandmother Harlan's) was Hugh Bateman. Maybe we had had a fight and he knocked me down – I don't recall—but I was stuck under him, when another kid, Fred Nason came by and extricated me "Friendly Fred" and I became the best of friends for decades thereafter. I remember years later; we were looking for girls along Sunset Boulevard and out of luck we went into the "Atlas Bar and Grill" (not sure now of the name). There was a good-looking "old lady" sitting at the bar – old, over 35! Well, our charms did not work even on that aged person, so we called it a day.

I really like pretty girls – Just look at my wife, Bonnie! Now back to the story: Hugh Bateman and I had been eyeing this pretty girl at the BABC, Laura Jane Willey – boy was she good looking! We saw her head into the BABC Women's Locker Room. Well Hugh and I scrambled up a wall behind the Volleyball court onto the roof of the Locker room. On that roof was a skylight that looked directly down into the women's shower. There was Lara Jane – we craned our heads to get a better look at that gorgeous body when --- the skylight gave way!! We tumbled down to the floor of the shower – wiped ourselves off, picked ourselves up and raced the HELL out of the women's locker Room! Thank God, no one really saw us! (Sorry Hugh – I'm telling on us.)

A great BABC friend was George Elkins (his sister Nancy, I had a crush on her, taught us dancing: hanging onto a chair to do the *Charleston*). Like Fred Nason and Hugh Bateman, he lived in Beverly Hills. George and I had "projects" together. One of them was to disassemble an old Ford. We took the engine completely apart, cleansed all the little engine parts and reassembled the Ford – we hit the starter button and amazingly the engine revved up and we completed a test run. We returned to the garage assembly point and guess what? In a corner was a big basin, filled with cleaning fluid AND a whole lot of parts – was *Ford Motor Company* over charging its automobile buyers for parts that were completely unneeded? Another situation with George: Roger Hopkins and I had an argument, and, like the old days, he challenged me to a fight – a boxing match in the BABC enclosed Badminton Court. George was my "trainer" and took me for workouts to the *LA Athletic Club* downtown. Punching bags, runs around the track, weightlifting, etc. George got me in great shape that weekend the fight was scheduled – several dozen BABC kids showed up that evening for the "Fight". Well, Rodger Hopkins must have taken

lessons from John Miller of *Emerson Junior High* fighting fame and, again, I had the crap beaten out of me. I am now completely retired from my boxing career!

Another BABC story, this time about dates with girls. One weekend Sandy Kemp, Jerry Lambert and I were having our usual confab about the dates we had the previous weekend. Sandy said he had taken out the most wonderful girl Saturday night, who really, really liked him (euphemism for a very hot date). Jerry chimed in and said he had had a date on Friday with the "girl of my dreams – she and I are now going steady!" "I said I think I have you all beat – my date Sunday was simply terrific and we have more dates scheduled!" What were the girl's names we all inquired in unison? "Ruth Nickolas" was the name we all blurted out THE SAME GIRL HAD DATED ALL THREE OF US LAST WEEKEND!

The spot:

Looking back at my life I cannot find many times that I was clever – except this one time. : My folks were leaving for a month or so abroad (Europe, Asia…). As usual I was admonished "Absolutely no ruckus fraternity parties at our home while we are away!" So, immediately after my folks' departure, I get a hold of my Phi Psi Brothers to plan a party at our home. "First, as to the punch – I have a really big bowl for it!" "Terrific, just put it in our Entry!" And so, the planning was on. We invited a whole crew. All began to arrive – drinking and dancing ensued – including, it turned out, dancing partially in the "giant" punch bowl! Of course, it pitched over. What a mess! Back to that spillage in a moment. One of our guests was Helen Volk, Brother Paul Merrifield's date (I think?). Anyway, she was interested in the study I was doing in Aerospace, especially "paths" to the Moon (actually, the orbit work under Dr. Sam Herrick's tutelage). I showed her some of my lunar trajectory work, especially some equations, in my bedroom –I'm no way a RJ Wagner, so that's all we did. Next morning, I was horrified by the stain in our Entry rug created by the overturned punch bowl! I worked on sponging and cleaning it all afternoon. The next day I enlisted the services of other party attendees especially a Chemistry major "I know everything about stains!" But whatever we did worsened the stain and my folks were to arrive soon. What to do? I made up some plastic cups of lemonade, Coca-Cola and orange juice and put them on a tray in the Entry. Two days later when I heard the Garage door go up, which signal my parents' arrival, I ran down to the Entry, picked up the tray. As I "excitedly" greeted my folks I upended the tray of liquids on **the spot**. My folks were amazed how difficult it was to professionally remove **the spot.** (Clever, wasn't it?)

Not only I wasn't usually clever, but also, I was not "quick" – again, except for one time: In an advanced math course a Mike B. (again, don't want to embarrass anyone

so let's just call him Mike B.) took his classroom chair behind me to my right. When exams came, he would surreptitiously (always use a big word even if a small word is better!) copy my paper. At final time I had had enough of this pest, so I secretly picked up **two** Blue Exam Books. The final was 50 minutes long. In one of my Blue Books, I put in almost all incorrect answers. I pretended to turn it in early after 40 minutes (I trashed it). Good old' Mike turned his in as well and left. I returned to my chair and completed the Exam in my second Blue Book. Even though I had already seen the questions I had to be quick and complete the Exam in but 10 minutes. When the Exams were returned my mark was an "A" and poor Mike received a "D" (lucky I didn't flunk him! Left a few correct answers). Mike was astonished when he saw my grade – I don't think ever discovered what had happened!

Now back to Helen Volk. A week after the Party I was deep in my studies, when Paul and Helen drove up to our home and Helen rang our doorbell. Dad answered and asked me to come to the door while he returned to their upstairs bedroom with my mom. "Helen, what's up?" "Paul and I want you to come with us to a party." "Helen I am far too busy to come to a party now!" "Well, Bob you weren't that busy at your party to have me up to your bedroom!" Right then a potted flower plant came crashing down on our front porch beside her! Apparently, my parents were leaning out the bedroom window (just above our front door) to listen and overturned the flowerpot. I went back to my room. I overheard my folks talking – no, they were arguing. Then Mom came into my Room and asked, "Is there anything you want to tell me about that Helen Volk?" No, I replied and continued studying. More arguing from their bedroom. Then Dad burst into my room and screamed at me "**Robert just exactly what the hell were you and that Helen doing in your Bedroom?"** "Working on equations Dad." Trials and tribulations of being a parent, I guess!

My Dad was on the way up: **President of the BABC** and had major wealthy clients like the stage and screen star Conrad Nagel, Mr Nason, President of *Beverly Hills Transfer and Storage*, Tom Jones, President of *Northrup Aircraft Company*, Lay Leishman who headed the *Tournament of Roses* (Rose Parade), et al. -- lots of income was in the offing out of his "golden file draw". As I said my mom and Dad were very generous to our kids and paid monthly to help his dad (my grandpa), but they also loved to travel Russia, Lebanon, Israel, France, all over, as independent travelers – no tours – but Dad was making enough money to more than pay for them.

Speaking of *Northrup Aircraft Company*, let me digress: Bonnie and I were at a reception at the *LA Country Club*. It was sponsored by a friend of mine, Kent Kressa – an Engineer/Scientist who made it in the business world (very few Engineer/Scientists do, perhaps he did because his folks were in Show Business). Kent took over after Tom Jones (my dad's client) as head of *Northrup-Grumman*

and brought the company to prominence by deftly acquiring other aerospace companies to grow to the aerospace/defense giant *Northrup-Grumman.* Kent, upon retirement, was appointed by President Obama as interim head of *General Motors.* Anyway, the reception was for a Ron Sugar, new President of *Northrup-Grumman.* As I reached Ron in the reception line and introduced myself, he stopped me and said, *"Wait a minute, you are the one with all the initials R. M L Baker!"* I said, "that's right" He said, "I took your classes and used your textbook for my PhD!" Just then I recalled an interesting story: Back during my "Professor Days" I came home to Bonnie one day and said: "I have this young genius in my class, a Ron Sugar – he is so young that I do not think he will assimilate well socially – certainly he will not work out in the business world." Boy was I wrong!

I loved teaching, but my ultimate success is that my students are successful -- that is truly a professor's orgasm! How happy I was, therefore, when I recently received the following message from a former student, Ken Kopke:

From: Ken Kopke <ken.kopke@yahoo.com>
Sent: Friday, December 20, 2019 3:28 PM
To: drrobertbaker@gravwave.com
Subject: Thank you Dr. Baker!

Dr. Baker,

Thanks so much for being ... well, Dr. Baker.

I was a student of yours in 1969 while getting an MS in astrodynamics under Sam Herrick at UCLA.

I much appreciated your unique perspectives on everything scientific. You were an original who always thought outside-the-box.

In 1970 I returned to Colorado Springs to teach astrodynamics at the Air Force Academy. I retired from the USAF in 1983.

At age 77 I am still working full time for a company, Omitron, that provides and sustains the software used by the USAF in the Consolidated Space Operations Center (CSpOC) at Vandenberg AFB in California to perform high accuracy (specific perturbations) orbit determination using Gaussian least squares differential correction. We've shown this to be superior to Kaman filtering – in its many different forms.

And you helped inspire my career!

Thanks again,

Ken Kopke
Lake of the Woods, VA
(currently supporting the Alternate Space Control Center in Dahlgren Virginia. Before that, nine years at Vandenberg AFB at the JSpOC/CSpOC. Before that, 16 years supporting the SSC/SCC in Cheyenne Mountain in Colorado Springs.)

And another message; this one concerning one of my books:

From: Moises Maraveles [mailto:barmar.moises@gmail.com]
Sent: Monday, June 28, 2021 6:43 PM
To: Robert Baker
Subject: Re: Big Connections! Question about your book "An Introduction to Astrodynamics"

Hi Dr. Baker, how have you been?

It's been a while since I read your last message of encouragement and I don't know in what way to thank you beyond writing to you. There has been a lot of adversity for me in the past two months, and **those words you wrote advising me to work hard and never give up will never go out of my head!** I have started to prepare for study at *Embry Riddle Aeronautical University* in United States. And I have been sending many emails to scientific experts and I am going further with my immigration process.

I need to thank you for another hit that I got thanks to your Book on Astrodynamics. It helped me out a lot in solving two main problems involved in obtaining a scholarship in a summer rocket development program. Your Book allowed me to solve the major problems presented in the test.

Thank you so very much again for all your emails supporting me and my career, Dr. Baker, Moises

CHAPTER 4

Goodbye Phelps Terkel, Hello Douglas Aircraft Company

Right after graduation from *Harvard High School* in 1949 and well before Dad showed me his Gold Mine of a file drawer, I knew that had to earn money to help my folks and to pay for "incidentals" at UCLA. Really not much in those days, less than $100 for "tuition" and a little more for Books and Lab fees. Nevertheless, I wanted to pitch in, so I looked around and found a job paying much more than *Phelps Terkel* and right up my alley – a Research Department for *Douglas Aircraft Company* (DAC) located in Building "A" at the Santa Monica Airport run by a Dr Klemperer "Klemp". I worked there afternoons after UCLA classes and nights and passed my pay along to Mom and Dad.

I graduated with a BS in Physics. In addition, I was given, with some ceremony, a *summa cum laude* certificate – apparently, I was first in my class at UCLA (of course the classes were much smaller then, than now). Although I was still most interested in Rockets, I choose to take a master's degree in Nuclear Physics since there was much talk about Nuclear Rocket Propulsion then. Of course, I was still taking Dr. Herrick's course series in Rocket Navigation – a curriculum in Aerospace was on the horizon but not there yet. This was a fabulous time for me. Klemp's research group was doing work for various classified Air Force projects and the National Advisory Committee for Aeronautics (NACA), the predecessor to NASA, as well as supporting DAC's work on the Thor medium-range missile – heady times for me!

It's a Bird, it's a Plane, no! It's an AOP!

One evening at DAC (I often worked the night shift after UCLA) Klemp came into my Office (a cubical). "Bob, we just received a new project from ATIC (Air Technical Intelligence Center at Wright-Paterson Air Force Base). It purports to be film clips of UFOs." I respond: "Sure Dr. Klemperer, but why me since you have over a dozen PhDs here smarter than I am?" "Well, Bob, UFO research is very scary to most of my people since it could easily ruin a reputation – since you have no reputation yet to ruin, I chose you!" There were two film clips. No need to go into details, but one was called the Montana film and the other the Utah film. The natural phenomenon candidate for the Montana film clip was airplane reflections -- so I needed to study that. As I related relative to the proper selection of party punch, I

love experiments – my own and others. (However, I am mindful of the admonition of Edger Dijkstra, the computer science pioneer: “Testing can show the presence of errors, but not their absence.”) For this photogrammetric experiment I solicited the help of my dad and fabricated an array of objects that he positioned to reflect into the camera used by Nicholas Mariana when he photographed the Montana “UFOs”. (Please see photographs below.) I also had the Air Force (with the help of *Douglas Aircraft Company* or DAC) fly two jets by and photographed their Sun reflections at different flight-path angles to the Sun. In both film clips I could not objectively rule out either natural or “unnatural” e.g., UFO Phenomena. Therefore, I coined: "the term *Anomalous Observational Phenomena* or “AOPs”. Like it or not I became the “go to” expert on UFO (or rather AOP) films! I authored a Chapter in Carl Sagan’s Book on UFOs and, as I will explain, in 1968 reported my findings to the *Committee on Science and Astronautics U. S. House of Representatives*. So much for my “reputation”!

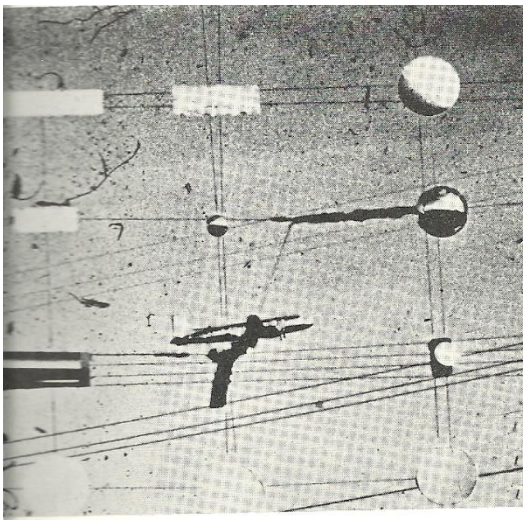
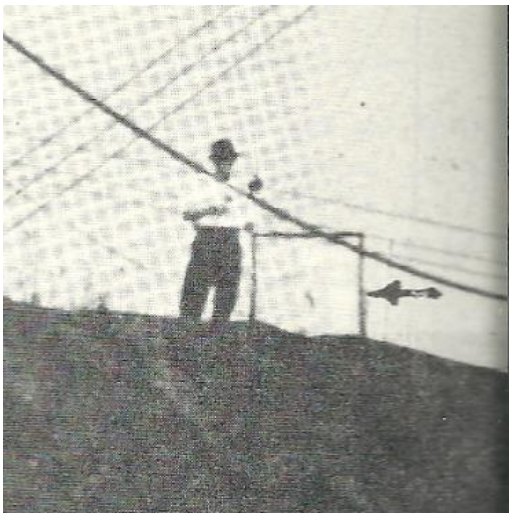


Fig. 6-22. Photographic experiment array.

Array of objects that he positioned to reflect into the camera used by Nicholas Mariana when he photographed the “UFOs”



My Dad holding the array while Sun reflections were photographed during Experiment

In 1954 I coauthored my first scientific paper and through 1955 I authored or coauthored about a dozen DAC technical papers on missile trajectories and satellite orbits. I loved the combination of University (at UCLA) and Industry (at DAC) research and development. But at Douglas I learned another kind of lesson: paraphrasing Oscar Wilde: ***Be careful what you bet on – you might win!*** At lunch one day at Douglas Building "A" an associate of mine and I were ogling a good looking fellow-employee girl. My friend bet me $25 that couldn't get a date with her that night. Well, I was up to the challenge and went right up to her and asked where she lived. She gave a location somewhere in Westwood and I said, "Why that is only a block away from where I live (of course, I had no idea where her place was) so why don't we ride share to work?" She replied, "Ok that might be a good idea." So, I said "Perfect let's get together after work for coffee and discuss it further?" She agreed and I went back and picked up my $25 winnings. Thus, I met my first wife, Janet Munch! We dated that summer before she returned to the University of Arizona. I liked her a lot and her folks. They told me that they were a very religious family and attend the *First Church of Christian Science*. Well, I was a Christian and a Scientist, so it seemed a perfect match. The long and short of was we got married and had a son, Robert Randall Baker. We had religious differences after all – separated (I moved in with my folks) and then divorced.

An American in Paris!

I was sent to Paris for a scientific Conference. In my newfound freedom from Janet, I was happily ensconced in a first-class American Airlines cabin. After some champagne I decided to seek an "escort" while I was in Paris. I talk to one stewardess after another, but no luck. One stewardess, apparently trying to bug me said "Well, Dr. Baker, why don't you just advertise!" I took it as a suggestion not an insult. I wrote a message on a napkin "Very good-looking Secretary wanted near Hollywood, California. Will provide for move to Hollywood and salary at 50% above current pay. Contact Robert Baker at the *George V* in Paris." Upon landing and reaching the *George V*, I was getting ready for bed when I happened to fish out the napkin. I had completely forgotten about it! So, I called up the Paris *Match* – they said that their "Positions Wanted" section had "Gone to bed." But they also suggested that I contact the *New York Times* Paris Edition. Good idea -- they took the Ad! Off to bed. I was awakened about 7:00 am by the room phone "Dr. Baker, I would like to be interviewed for your position." Again, I barely remembered the napkin and Ad I placed. OK, I said, let's meet for lunch here, she replied "How will I recognize you?" I stated that would be carrying a Book on Astrodynamics with my picture on it. As soon as I hanged up the phone it rang again. This time I decided for dinner. Upon hanging up another ring! All this lasted about two HOURS! On a big yellow sheet, I listed several dozen (possible) appointments I had three appointments for breakfast, lunch, before dinner and dinner! I would go down the *George V* lobby and three girls would be lined up on seats. I would flash my book to the best-looking contender and leave with her. The next day the Concierge of the *George V* approached me "Dr. Baker I have been a Concierge here for 26 years and have never seen so many women lined up for a guest – what is your secret?" I replied, "Just an American in Paris."

After returning from Paris in 1962 I packed up my things and moved out of our home in Westwood, 10600 Le Conte, to stay with my pal, Paul Merrifield. It was a melancholy moment. I loved my old home. In Europe your family home stays in the family - it goes to the first-born Son. If I had anything to do with it, I fervently wanted this wonderful place where I grew up to remain in our family forever – the "Bob Baker Place." Well, I guess time will tell.

Oh! I almost forgot (remember – no chronological order!): ***You're in the Army Now! (Or rather the Air Force)***. No! Not me – must be a snafu! I reached the Westwood Federal Building Air Force Office. I had been in the AFROTC for three years as an undergraduate. They paid me about $26.50 a month (went to my folks to help them out). I was now just starting out my career at Aeronutronic Philco Ford, a good salary

and I thought that I was "a man on the way up!" Let's see 36 months times $26.50 = $954.00. So, I presented a check in that amount to the Air Force Officer in charge, "Are we clear now?" I asked. "No lieutenant Baker we are not clear – report for duty next month!" I arrive at the *Air Force Ballistic Missile Division* (AFBMD) in El Segundo to report in. my superior, Lt. Col. Bjornson ("BJ"), took one look at me and said "Lt. Baker you have your ROTC Outfit on, which is OK, but when you went to the Commissary to pick up your insignias you purchase Enlisted man's not Officer's insignias. Go home, purchase the correct insignias and we will see you tomorrow". A bit embarrassing, but that all changed for the better the next day.

"Major General O. J. Ritland, the Base Commander wants to see you Lt. Baker." Wow! What could he want with me? Upon entering his office, he said "Please sit-down Lt. Baker. From your record I see you are the first to graduate with a PhD in Aerospace, especially orbit determination. Here we launch a lot of rockets, but no one here is really qualified to know where exactly they go! You apparently know! So, I am setting you up here in a separate office, with your own secretary. I understand you have a little, shall we say 'uniform problem' so you will not be expected wear a uniform unless the need arises. Understood Lieutenant?" "Yes Sir!" Gertrude was my personal secretary. One day I was walking across the Air Base when a fellow officer passed me by going the other way but exclaimed in passing "Bob I was just in JAG's (Judge Advocate General's) Office and I see you are up for Court Marshal. Stopped me in my tracks! **Having been thrown out of Emerson Junior High School and UCLA, I really did not want to be court-martialed by the USAF!!!**

I raced to the JAG's Office and after a lot of runaround found what I was accused of. I was accused of publishing a TOP SECRET part of the Ballistic Missile Firing Tables! "What part?!" I asked the Legal Officer in charge. He replied, "The Equatorial Radius of the Earth, 6,378,150 meters." "You must be kidding – they took that number from a scientific paper I had written– not the other way around!" OK he said:" but the simplest thing is to get the standard letter of approval for the subject paper you just published" Whew! I went to my Office and asked Gertrude for a copy of that standard technical-paper approval letter; she said, "No problem, I remember it." 4:15pm arrived and no letter. "Oh! Lt. Baker I looked and looked and just could not find it – sorry." "Gertrude if don't find that letter they will lock me up in *Leavenworth*!" The next morning, I found that Gertrude had indeed been working on my problem – on my desk was a cake she had baked for me. "Gertrude, unless

there is a hacksaw in that cake it is of no value to me!" We searched for hours and finally found the letter in the pages of an *Aerospace America* magazine.

Two other noteworthy evens during my Air Force tour of duty: as the Air Forces "expert" on orbits and trajectories, I was privy to all the TOP SECRET SPECIAL ACCESS REQUIRED programs. The Ballistic Missile Early Warning System (BMEWS) strung across Canada was just being turned on. I was sitting next to a CIA Officer in a Control Room (actually, a huge locked safe) to watch the event. They turned the BMEWS system on and suddenly across a giant display screen appeared: "WARNING, WARNING, 8 Ballistic Missiles Launched from Russian Sites!" A few seconds later it was 50 Missiles, then 500 hundred – excited cries were heard across the room – were the Russians attacking? Should we alert the President? The CIA Officer next to me said "Calm down Lt. Baker. I was just on a highly classified mission inside Russia, and they could not get half a dozen of their missiles off, let alone hundreds – they do not understand *maintenance*!" Sure, enough the warning was rescinded – apparently BMEWS had not picked up Russian missiles approaching over Canada but rather **the Moon rising – simple glitch!**

Little Lt. Baker was representing the USAF in Stockholm, Sweden at an International Astronautics Conference – I was presenting a technical paper there and General Ritland nominated me as representative. I was staying at the *Malmen Hotel*. In the Hotel Lobby I noticed someone watching me. At the Conference Auditorium I saw he was also there in a rear row. Then I glanced down the seats and there was David Arnold, the famous General "Hap" Arnold's son (Hap Arnold was a **5-star AF General**) and, more importantly to me, Barbara Douglas's husband – I knew him through her, and my *Harvard School* friends and her brothers Jim and Malcolm Douglas. I went down the aisle to greet him. "What are you doing here Bob?" "Guess what I'm representing the entire USAF at the Conference." "Wait a minute – I am the Air Force Attaché at the Embassy here and … you have all of those initials – R. M L – don't you?" "Yes!" "Well, we just received a cable on you – seems Garry Powers recently went down, and you became privy to all the classified satellite reconnaissance projects to replace his missions – you are now out of the Country and currently under surveillance!" Well, now I understood who that fellow was watching me! So, as I left the Conference Auditorium, I passed him and commented "Let's save the government some money and ride together to the hotel". "OK" he said. As we road in the taxi I said "We can save the government more money if you join me for dinner. "He turned to me and said: "No Lt. Baker, you are only an eight to five surveillance!"

CHAPTER 5

Yes, but can he change a tire?

In 1958 I made Glamour Magazine!

"I read that UCLA had conferred the first Ph.D. in space navigation. 'Who is he?' I wired madly. The University wired back: 'Robert M L Baker, Jr. staff member Aeronutronic Systems, Inc., and Assistant Professor of Astronomy here … his specialties are in the fields of celestial mechanics and rarefied gas-dynamics … currently studying space-vehicle orbits and low density drag and sputtering with particular emphasis on high-speed re-entry from interplanetary orbits'. Yes, but can he change a tire?" *Glamour Magazine*, 1958:

Glamour's

the MEN in our lives

Robert M. L. Baker, Jr.: space doctor.

■ *Plenty of space:* I read that UCLA had conferred the first Ph.D. in space navigation. "Who *is* he?" I wired madly. The University wired back: "Robert M. L. Baker, Jr., (left) staff member Aeronutronic Systems, Inc., and Assistant Professor of Astronomy here . . . his specialties are in the fields of celestial mechanics and rarefied gas-dynamics . . . currently studying space-vehicle orbits and low density drag and sputtering with particular on high-speed re-entry from interplanetary orbits." Yes, but can he change a tire?

Then, later I hit the Newsstands again. This time the *Saturday Evening Post!* Or is that my Grandson, Alexander Fell, pictured in the Article?

PEOPLE ON THE WAY UP

U.C.L.A. TEACHER DIRECTS TRAFFIC IN OUTER SPACE

U.C.L.A.'s Robert Baker was the first man in the country to get a doctorate in astrodynamics. And what's astrodynamics? It's the new science of designing and predicting the paths that space ships will take.

This week, The Saturday Evening Post spotlights the California scientist as one of the "People on the Way Up." You'll learn how his research takes him into five different fields. How he compares astrodynamics to the other space sciences. And how he first got steered into this strange profession.

Look for him in this week's Saturday Evening Post. Pick up your copy today.

THE SATURDAY EVENING POST
A CURTIS MAGAZINE

Spatial Pathfinder: Against a photographic backdrop of the moon's crusty surface, Robert Baker, 31, looks toward the day of interplanetary travel. His specialty: Astrodynamics, the new science of designing and predicting space-vehicle paths. "One could visualize radar and optical telescopes as the eyes," says Doctor Baker, "propulsion systems as the muscles and astrodynamics as the brains of our space systems." Assistant professor of engineering at U.C.L.A. and staff scientist at Lockheed Aircraft, Baker is pursuing research in five fields: (1) analysis of the Russians' Venus probe; (2) "astrodynamic constants," reference points for space-flight computations; (3) "orbit determination," procedures for predicting orbits; (4) "tracking-net control," application of tracking-station data; (5) "universal variables," application of theoretical factors to astrodynamic problems. Baker teaches a unique two-week course at U.C.L.A., Astrodynamics and Rocket Navigation, a superadvanced study for such space engineers as North American Aviation's director of flight sciences and professors from the Air Force Academy. Baker, son of a Los Angeles lawyer, started exploring the cosmos in the eighth grade, wrote his first school paper on meteorology. Majoring in physics at U.C.L.A., he was a Phi Beta Kappa, graduated with top honors, and in 1958 received a Ph.D. in engineering and astronomy (astrodynamics), the first such doctorate ever awarded. Last year he joined the U.C.L.A. faculty, working with Dr. Samuel Herrick, who, as Baker's teacher years earlier, had suggested the embryonic field of astrodynamics to his most promising student. Baker lives with his wife Jan

I had completed my master's degree in Nuclear Physics and was now totally committed to Dr. Herrick's Astrodynamics. Problem was that that program was more *applied science* or Engineering than Astronomy or Physics. To obtain a PhD in Engineering **I would need to complete all the Engineering core courses!** Lots of work (I wound up having over 400 units under my belt, only 200 required to graduate). I took courses in **both** summer sessions. One of those courses was "Steam Plant" in which we were part of a team to fire up the UCLA steam generators on Westwood Boulevard during the summer. We did it rather quickly. Just before UCLA's regular courses commenced the University's electrical meter was read while we were generating power. The meter reader saw the meter running backwards since we were **generating** power and thought it was wired in wrong, so he **reversed the connections!** When the monthly electrical bill came into the University it was not a bill, but a check from the LA Department of Water & Power for several thousand dollars! The meter connections were quickly changed back!

In early October 1957 the Soviet Union successfully launched Sputnik 1. Very exciting and really accelerated the Nation's interest in Astronautics. The timing was perfect for me and when my PhD was awarded in 1958, as could be read in that *Glamour Magazine* article, my degree was the first! Lots of fame, for example, I flew with Dr. Herrick to Paris where he received the "keys to the city" -- big honor... big dinner for the two of us at the City Hall (a waiter behind every seat – my wine glass never was less than half full!). We were literally "the toast of the town". I coauthored my first book (my second, if you count "*The Kiddish Country*"), "*An Introduction to Astrodynamics."* My technical papers (well over 200 of them) and my tens of thousands of books sold speak for themselves as to my research.

As an aside, besides developing and publishing new ideas and theories, I love to invent and build things. Back on Crenshaw in the 1930s I built a little model of the island I wrote about (dictated actually) "*The Kiddish Country*." It was now (again – forget chronological order!) the 1940s and I loved *Popular Science* magazine where I read about Alan Turing and Von Neumann and their electrical computers. In Westwood (10600 Le Conte) I designed a Lionel-Train layout. Later on, I designed the layout to simulate a computer (essentially a railroad yard-like series of railroad tracks for storing, sorting, and loading and unloading, railroad cars). Then, while attending *Harvard High School,* I decided to build a Van de Graaff generator "atom smasher." I mentioned it previously, Chapter 3, in connection with my laboratory "loft" at 10600 Le Conte, where party punches were tested. As shown in the Figure in Chapter 3, the "Atom-Smasher's" design consisted of an electric-motor driven cloth belt running up an insulated plastic tube to a spherical aluminum ball. The idea was to rub the belt with brushes and charge up the metal ball (static electricity) to about half a million volts. (At this I must introduce a compact way to present

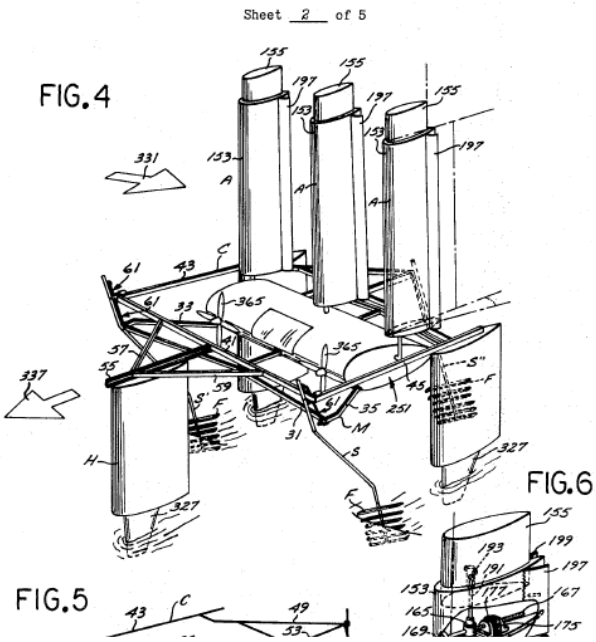
numbers “exponentially”. Half million is 500,000 or $5x10^5$) As a true “atom smasher” a much bigger Van de Graaff generators reached millions of volts and electrically propelled atoms to “smash together”. Unsure about its design, “little teenager Bobbie Baker” took a bus and went directly to Cal Tech in Pasadena to visit a Professor Charles Lauritsen – I had read that he knew everything about a Van de Graaff generator – but did not know he was a famous scientist who invented the *Lauritsen electroscope*. He was so nice and answered all my questions as if I was a fellow scientist!

Professor Lauritsen also gave me some good educational information when I ask him “… why are those copper rings, which I painted white, arranged in intervals up the Van de Graaff generator’s support tube?” (Please see photo in Chapter 3.) “Well Bobbie (I was about 13 years old) you must always remember the fundamentals – this time the basic relationship between voltage, current and resistance $V = IR$– always start using the basic laws! For a uniform electrical field, you want to spread the field evenly along the tube, so you space the rings evenly along the tube and connect them by high-resistance elements in this case by mega-ohm resistors to conduct a smidgeon of current and develop a uniform voltage spread – OK Bobbie?”

Rigid Airfoils Test Stand with Wind Generator, adjusted by Bonnie Baker, August 29, 1978

Later on I worked with another Harvard student and good friend, Jim Douglas, on sailboats. (as previously noted, Jim was the son of the famous airplane manufacturer, Donald Douglas). We built a little sailboat in the back yard of 10600 Le Conte in the 1940s. We eventually designed a hydrofoil, ridged airfoil sail craft in the 1970s

based on a patent I had been awarded (United States Patent Number 3,532,067, "Water Conveyance Apparatus," October 6. 1970). One day while living at the Marina del Rey, Test Stand shown above, I was adjusting the ridged airfoils on our Cal-20 sailboat that I had converted into a floating laboratory. A passerby looked at it and exclaimed "That is the strangest looking thing I have ever seen in this Marina – except for some strange hydrofoil conveyance that had been sailed around here!" I said, "That's mine as well."



<u>A photograph of the actual craft operating in the Marina del Rey is in Chapter 8</u>

Jim and I formed a corporation, *Transportation Sciences Corporation* or TSC in 1967 to build and promote the new craft as well as an unmanned sea craft (High-Endurance Automatically Translocating Subsystem or *HEATS*) pictured below, we built and tested under contract to the U S Navy to tow a hydrophone array for submarine detection (*SURTASS*), more on that later in Chapter 10. By the way, several farsighted, inspirational souls, such as Frank Atkins, Al Barry, and Larry Bishop joined us as shareholders. Our vision for TSC was to develop and promote the transportation of people and/or microelectronic devices utilizing my patented ridged-airfoil propelled, hydrofoil watercraft in the ocean and the transportation of people and/or electronics using StarCraft in the Universe, as well as unmanned robotic artificial-intelligent, computer-controlled vehicles and gravitational wave detectors and generators (suggested by wife, Bonnie).

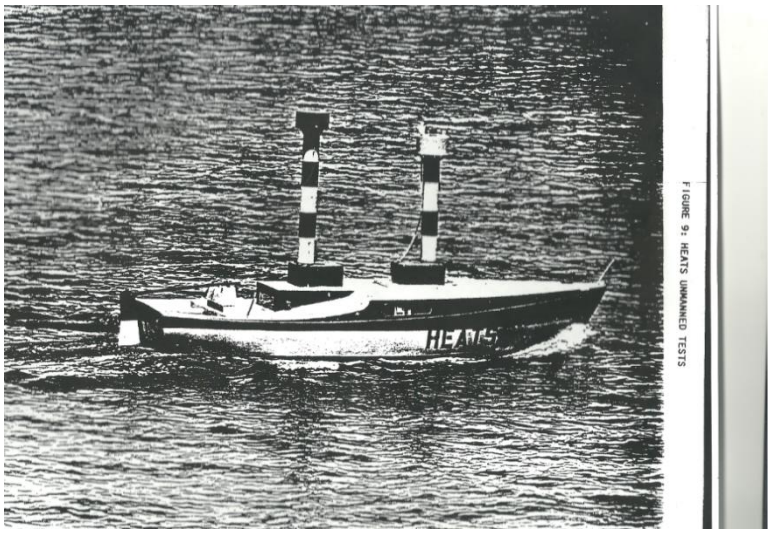
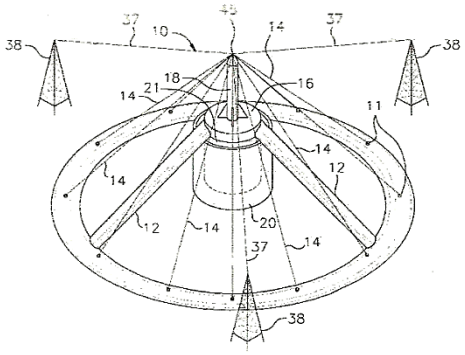


FIGURE 9: HEATS UNMANNED TESTS

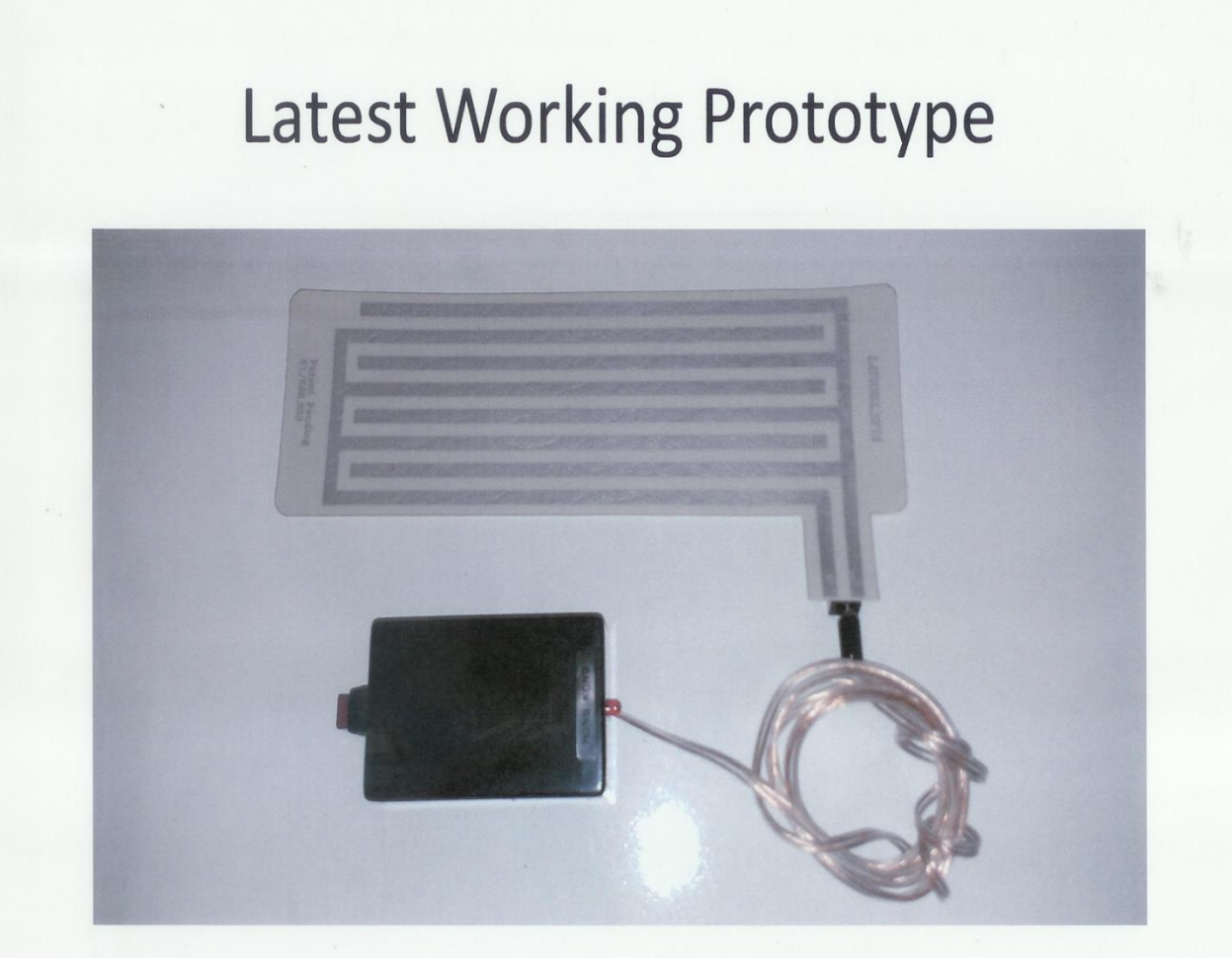
I also worked with another great friend, Fred Noble (founder of *Wintec Corporation* that owns and operates about a third of the wind turbines in Palm Springs and Livermore). I invented and we patented together (United States Patent Number 6,160,336, "Peak Power Energy Storage Device" including some other important matters that I will discuss later) a huge flywheel device (hundreds of feet across made concrete and floating in a huge liquid basin) to store wind electrical energy to put on the grid in the doldrums. I built a small model of it shown below. We formed another company, *Peak Energy Sciences* to promote it. As I will discuss later, in connection with my analysis of the misconceptions accorded "Global Warming," I abandoned the project.

44 Claims, 18 Drawing Sheets



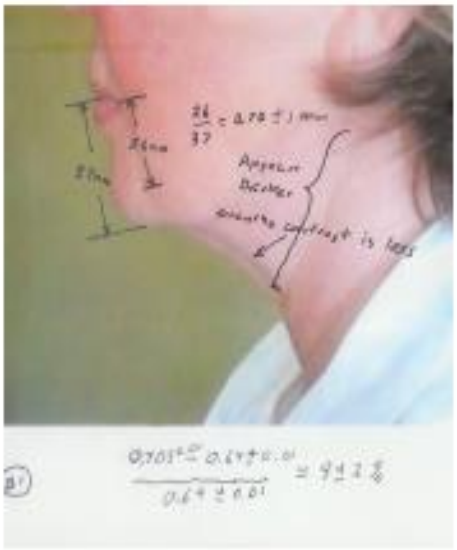
My Son Robbie and I dug out a “room” underneath our home in Playa del Rey, built in 1972. There I constructed an “In house Chamber of Absolute Security” or INCASE. Its walls, floor and ceiling were 18-inch-thick steel reinforced concrete with metal sheathing to protect against electromagnetic pulse. It was poured on rubber vibration-absorbing pads. Air entered through blast-proof plenum chambers and CBR (Chemical, Biological and Radiation) filters and there were bags of CO_2 absorbing potash, 3 oxygen tanks, since you could “button it up” like a submarine. Batteries connected to rooftop solar panels provided the power. Communication was via a computer modem, short wave, citizens band and marine band transceivers. I had a marine toilet, shower, 50 gallons of distilled water and 42-man days of food. I even had a library of movies so we would not be bored during a long period of shelter. We could “see” outside using closed-circuit TVs spotted all over our home as well as telescopic TV cameras on the top of two 30-foot-tall poles where antennas for the transceivers were also attached. At the time I was an avid fan of the TV series *Star Trek* and for the “secret” doors I wanted those sliding doors that opened and closed with “Swish, Swish” on the starships. I knew one of the Producers and inquired as to where I could obtain a pair of those “wonderful” doors! He advised me “You will need to hire two stagehands to move the door panels and get an audio system to provide the swish, swish.” I decided instead to use an electrically operated door at the back of a pretend broom closet. I had hoped to market INCASE, developed a marketing plan and appropriate brochures. I even had my *Harvard High School* buddy Dave Hull as sales manager. But no takers!

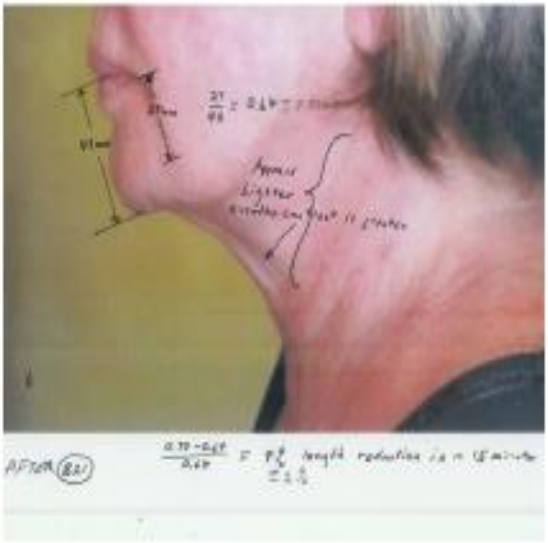
With my internationally known dermatologist, Dr. Larry Moy, I invented, and we patented (US Provisional Patent Application Number 61/688,663, "Electrical Muscle and Skin Treatment Apparatus,") an electronic facelift pad that I fabricated, tested, and demonstrated its effectiveness (experiments on Bonnie, see Quantitative Wrinkle Measurements photograph, and on her friends) to permanently reduce wrinkles on the face. First, one of many quantitative measurements of actual wrinkle reduction after several weeks (developed the idea somewhat from the Frankenstein's Monster stories):



Quantitative Wrinkle Measurements

One 15 Minute Session and two weeks after,
9± 2% reduction in wrinkle length





Wrinkle ends marked and measured

69

But, of course we must provide the final PROOF!!!

We also utilized one of Dr, Moy's Chinese potions. It was a cream to correct Erectile--Dysfunction. We called it "*Erectit".* You coat man's most important part with it. We tried it on one of my Pals, Fred Hameetman (see earlier email to him and Kip Thorne in Chapter 3). He complained that it did not work. I told him our motto: "If it doesn't work right away, then just keep on rubbing!"

Finally, I have patented many devices including some of those listed below to generate and detect high-frequency gravitational waves (HFGWs) and they will be discussed in Chapters 9, 10 and 12. These concepts were an outgrowth of a *Lockheed Astrodynamics Research Center* (LARC) Lecture in 1961, also I incorporated *Gravwave LLC to* hold some of these patents:

United States Patent Number 3,532,067, "Water Conveyance Apparatus," October 6.1970,

United States Patent Number 6,160,336, "Peak Power Energy Storage Device and Gravitational Wave Generator," December 12, 2020,

US Provisional Patent 61/575,076, "Gravitational Wave Generator,"

US Provisional Patent 61/343,473, "Multiple-Layer Radiation Absorber,"

United States Patent Application Number 11/173,080, "Gravitational Wave Propulsion,"

Canadian Patent Number 2,391,486, "Peak Power Energy Storage Device and Gravitational Wave Generator,"

United States Patent number 6784591B2 "Gravitational Wave Generator Using Submicroscopic Energizable Elements,"

United States Patent Number 6,417,597 B1, "Gravitational Wave Generator,"

Peoples Republic of China Patent Number 01814223.0, "Gravitational Wave Detector and Generator,"

US Provisional Patent 61/575,076, "Gravitational Wave Generator,"

US Provisional Patent 63/072,992, "Airborne Conveyance Operatively Connected to a Fruit-Collection System" September 1st, 2020

Unfortunately, not one of these patents have paid off so far. But as Frank Sinatra sings

" I 've been a puppet, a pauper, a pirate
A poet, a pawn and a king
I've been up and down and over and out
And I know one thing

Each time I find myself flat on my face

I pick myself up and get back in the race"

(Composed by Kelly Gordon and Dean Kay in 1960.)

I've not held any of those jobs that Sinatra sang about, but my work has been quite varied and I always "… get back in the race". It is either perseverance or persistence or plain stupidity that propel me forward in inventing, experimenting, theorizing, and building new things and ideas. Basically, **I produce ideas not money!**

CHAPTER 6

Did You Ever See a Dream Walking?

&

"Don't touch my left toe!"

The Story of Bonnie Sue Baker

It all started on the late afternoon of November 14th, 1964, in the parking lot of the *Bel Air Presbyterian Church*: "I am not getting into that car and get my Wedding Dress all dirty!" – My Best Man, Dr. Paul Merrifield, forgot to take us to our Wedding Reception and I was stuck with transporting my Bride in my used ("pre-owned") Porsche – as they say, "Girls are made of sugar and spice and everything nice and Boys are made of snips and snails, and puppy dog tails." Well Boys are also rather messy and, yes "dirty" and Girls (especially those having Norwegian linage) are neat and very "clean." A few years later this difference became abundantly clear when we were on our way on Highway 5 to San Francisco. There was a thirty mile stretch of road with no gas stations or comfort stations and in the middle (point of no return) we had a flat! Well, we were in a car with what are called "skirts" around the tires, and they are difficult and messy to change. After a frustrating time changing the tire, I started to enter our car where Bonnie was busy painting her nails in anticipation of our evening in San Francisco. She turned to me -- my hands were very grimy from the tire – and said: "You are not getting in this car so dirty!!" Don't have the wrong idea about Bonnie just because she is an inordinately clean person. I clearly remember the day I first met her. It was in 1962 and she was walking down Sepulveda Boulevard near Moraga Drive in Bel Air, California. My second in command at the *Lockheed Astrodynamics Research Center* (LARC) there, Dr. Merrifield (already noted), had advertised for an Executive Assistant. Well, he was not really interested in typing or shorthand speed but fantasized that his female Assistant would accompany him on his skiing trips. I looked through my window at Bonnie approaching our building. Since, after separating from Janet, I had returned from a successful hunt for girls in Paris, I was as they "looking!" The words to the song "Have you ever seen a dream walking" (Harry Revel, 1930) came to mind. She had on white gloves, purse, and hat – Wow! I had never seen a prettier girl. So, I punched the phone and said to Paul "I don't care if this girl applicant can ski or not, but I want you to interview her and I would like to see her as well!" Well Bonnie had gone to San Jose State, was a Physics and Math Major (I think she majored in

about a dozen different subjects, including especially "Boys") and "enjoyed typing equations." Paul hired her. Here I must remark that there is not much luck in life. As Mr. Zanuck told me: "…just work as hard as you can from dawn to dusk and you will make it!" – Actually, it is surprising how lucky you are when you work hard! But wait, there is one area where there exists *luck*: it is *marriage*. You cannot meet every girl in the world and systematically select, and, as I was telling an old pal of mine, Kent Kinsala, there is no guarantee a marriage proposal would be accepted and even less likely that your spouse and you will go through all the passages in life hand in hand. So that is luck and I had it in spades with Bonnie in meeting her that fateful day!

Since I have reminisced about times prior to our wedding, I will bring up another story – of course it is out of chronological order! Every so often there was a professional conference in the aerospace industry. One major one was sponsored by the *American Rocket Society* (now the American Institute of Aeronautics and Astronautics or AIAA). Well, the Conferences had Hospitality Suites and we attended one sponsored by Douglas Aircraft Company. There were cocktails and music and even dancing! One popular dance at the time was called the "Limbo" and involved dancing under a horizontal pole. The object was to dance under as low a pole as possible "How low can you go?" as Cubby Checkers sang it. Well Bonnie was an absolute expert and could beat anyone at going under the lowest pole. To facilitate her performance, she said that using a pair of pants, such as I was wearing, would be very beneficial. Well, I went into the suite's bathroom, took off my jeans and Bonnie replaced her skirt with my jeans. I sat in the bathroom and listened to the dancing. I could hear that Bonnie won the contest and eagerly awaited her return to the bathroom. But Bonnie did not arrive! – I listened to the music, the laughing crowd …, but no Bonnie! Finally, I put on her skirt, went out of the bathroom, and retrieved Bonnie.

Bonnie loves to travel and so do I. One of our first trips was to Italy. We rented a Fiat (stands for "**F**ix **I**t **A**gain **T**ony") convertible and were driving from Rome to the coast. We were on our way to Assisi for lunch and Bonnie was driving in her polka-dot bikini and slightly rear-ended another car filled with young Italians. As I said I consider Bonnie to be breathtakingly beautiful (in fact, the *Most Beautiful Girl* or **MBG** – please see pictures of her below – **I rest my case!**) … as my son Robbie said upon viewing picture of Bonnie taken while we were dating: "I see why you married her dad!" (Even recently Bonnie entered a local restaurant and the couple waiting for us there – Lloyd McAdams – said that the level of background talking picked up immediately upon Bonnie's entrance). Back to the drive to Assisi. After the "bump", the Italians approached Bonnie, she smiled and when they asked for insurance papers she simply said "Hertz Car." After staring at Bonnie for a moment

or two that satisfied them. We lunched and as she was driving down the hill from Assisi, low and behold the same car filled with Italians was in front of us and they yelled “Momma Mia that crazy blond is behind us again!”

Bonnie at 21

Bonnie at 26 or 76?

Perhaps our best trip was over a month-long trip to Africa. It was perfectly planned by Bonnie. On the last leg we flew to Mauritius. At the Johannesburg airport we were delayed for almost 10 hours due to "mechanical difficulties." Bonnie finally asks me to look at our airplane. I returned and told her things did not look too promising: "The cowling is off the port engine and the pilot is looking at the exposed engine and scratching his head!" Just then the pilot announced, "ALL ABOARD!" Some Nuns started counting their beads and the Muslims prayed on their prayer rugs, but we made it! We stayed in a fabulous Mauritius Hotel ("Prince" something?). We had our own private pool and personal bird (tweeted at us each morning and greeted us whenever we returned during the day)! It was my 70th Birthday and in celebration

we decided to attend the Lobster Bake Beach Party. At about 9 pm people started to arrive, and Bonnie said it was now the appropriate time to take our Table. At 10 o'clock everyone turned to observe an amazing entrance: six immaculately dressed guests – men in silk suites, women covered with diamonds – one especially in the lead had a necklace with triple stands of diamonds. They took the Table right next to us. We asked our waiter who they were. "Princess Caroline of Monaco – she has a place here." Well, the Beach-Party guests were atwitter with talk. I told Bonnie that I was off to the Men's Room. Bonnie said, "Please go by their Table and see what they are talking about." Ok, so upon my return Bonnie asked: "What were they saying?" I said I overheard them saying "THAT'S BONNIE BAKER OVER THERE!"

More on our travels later.

Now to Bonnie's toe. One time Bonnie was talking to our Physician and asked him what the symptoms were for various maladies? The doctor said "Bonnie, you tell me your symptoms and I will tell you what malady you might have – not the other way around!" Not that Bonnie is a hypochondriac, but when most people first have a headache, they take two aspirins – Bonnie wants a brain scan. Bonnie's maladies are, starting from the top of her head: occasional headache, rosacea**,** lip herpes, contact lens problems, macular degeneration, chronic coughing, post-nasal drip, right-shoulder rotator cup rip, left thumb pain (while cleaning a cabinet her hand was once trapped under a shelf and I did not respond quickly enough to her screams for help), trigger finger, back problems (was operated on the L4 and L5 region of her spine twice and had five epidural injections), stomach aches and pains, sciatica, knee problems (had a left knee replacement and a right replacement later) and foot problems. Many of her health complaints can be eased by rubbing – especially her butt and her toes. Her toes in particular, except for the especially sore left one, are a source of great comfort to her if strongly pulled "… with <u>BOTH</u> of your hands, but for heaven's sake **don't touch my left toe**!!!"

Smart as a whip and soaking up knowledge like one of her cleaning sponges; that's Bonnie. Unquestionably she would have been awarded all A's in High School were it not for one factor: her contagious outgoing personality that sometimes eclipses her intelligence and lead to deportment demerits for talking – she just loves to chat! Extracurricular activities occupied Bonnie: The Band, Basketball, Cheer Leading and, yes, especially Boys. One summer in High School she dated 100 different boys – probably a record that may stand today! In the late 1960s (I think) she worked for *Online Data Processing* (ODP). She trained in the burgeoning new field of word processing. One day her job took her to Canada. I went to LAX to collect her. I recognized her bag going round and round on the carousel … but no Bonnie. Finally,

she showed. Apparently, she inadvertently cued up with non-US citizens. The Customs Officer demanded that she show her passport (at that time it was not required for Canadian travel). She did not have it but fumbling around with her wallet her store of credit cards fell out. The Custom's Officer said "Lady, anyone with all those charge cards must be a US citizen so you can pass." Speaking of credit; when we returned from our honeymoon, I was surprised to find a revolving credit-card bill in our mail. I considered it an "inverse dowry." Well, those revolving credit cards were like a merry-go-round out of control! So, I asked my secretary (now I worked at Computer Sciences Corporation) she was Bonnie's sister, Merrilee Reid (also good looking) to write letters to all Bonnie's creditors. She was an excellent secretary and really relished typing those letters. They stated in no uncertain terms that I was no longer responsible for Bonnie's debts! Well just to be sure I collared Bonnie one day and marched her up to the *Beverly Hills Robinson's* Credit Office. I demanded to see the Credit Manager. I cut up her Robinson's charge card in front of him, showed him the letter and asked him to look at Bonnie "See this lady" I said, "Please never extend her credit again!" Next morning Bonnie and her girlfriend Marilynn Smith returned to Robinson's since she needed to buy some serving plates. They asked for her credit card, and she replied, "I don't have it, but I know my charge account number." Somehow Bonnie had memorized ALL her charge numbers! In her defense I must state that several years later Bonnie paid off all her charge accounts out of her own salary and cut up all her cards! But back to Bonnie's intellect (aside from her uncanny ability to memorize charge card numbers). Bonnie has always been interested in science (thank heavens, even in high school she wrote Dr. Krafft Ehricke as to how to get into space science) and was a *docent* at LA's *Museum of Science and Industry* – her job, of course, was to guide the visitors through the human reproductive system (SEX) display!

One of Bonnie's co-docents Bonnie invited to join her (pictured on the left), was her good friend Joyce van der Velden, who lived on Park Avenue (so far impressive) – but the city was Little Chute, Wisconsin. The *LA Times* pictured them (above) at the LA *Museum of Science and Industry*, viewing a Moon rock collected by Astronaut David Scott. Also, a good friend of ours as was David's wonderful wife, Meg. Al Dieda was courting Joyce and one afternoon asked me to put in a "good word" for him. I told him that I would if he washed my car. Well, that gambit worked out beautifully – he did an excellent job on my car! Oh, by the way, my "good word" helped as they soon got married.

Because of her smarts Bonnie once worked for "Astrophysics Research Corporation" or ARC, a very high-tech defense contractor. One day after work I took Bonnie to a pub on Westwood Boulevard, "The Red Log" (there is another story related to that place concerning my being "inept, but I love you anyway" that I will not repeat). Anyway, she glanced at her notes from her first day at ARC and asked "Bob, tell me about some projects called 'penetration aids,' 'long-wavelength Infra-red satellite sensors,' and 'over-the-horizon radar.'" I had a TOP SECRET Security Clearance and Bonnie must have had a CIA security clearance even higher than mine – but I was startled! "Good grief!" I whispered to her "I only know that those projects are a few of the most sensitive ones our Country has today – so please don't bring them up in a public place." These projects have been long since declassified; but at the time, even mentioning them would have been a great breach of our national security. They were never again discussed.

"Deal me in!"

Bonnie loves cards, but the game of Bridge (was my mom's favorite) was never popular among her friends. A few years back, however, she became seriously interested in the game (and still is today). She started taking lessons at the Bel Air Country Club and within a couple of years she and her partner, Susan Smith, won two Bridge Tournaments. The other day Bonnie commented that she had not "done well" (for Bonnie a euphemism for being dealt bad cards) at a Bridge Party. I asked how she came in compared to the other girls "Oh, I tied for first place." That's Bonnie -- hardly a dumb blond. By the way, Bridge is not for me, I have very little so-called "*intermediate memory*" between a working memory and a long-term memory (can't remember people's names a few seconds after being introduced, for example)*. After playing a few hands with her instructor he asked me "Now Bob, after there have been two rounds of hearts... "I looked dumbfounded and interrupted him by "there have?" The instructor stated, "Bob I don't think Bridge is for you!" I

did, however, play an occasional hand of Bridge as Bonnie's partner despite my memory "impediment." One time at Jim and Jane Foster's place we were playing in front of their fireplace. It was roaring and apparently an ember came out of their chimney and started a roof fire! Jim immediately called the Fire Department, and they came quickly. The Fire chief ordered us to "evacuate immediately!" Having not completed our Bridge hand, we were slow to respond. The Chief ordered a "Fire Blanket" be thrown over the four of us and the Bridge Table. This did not, however, speed up our Bridge game! Jane is very smart and even posed a vitally important rhetorical question: "Why is it that we do not have as much money as we have good looks?" Jane Foster and Bonnie (and I) became the very fast of friends, in fact she was the "magnet" attracting us to Palm Desert in 2015.

Bonnie has a thirst for knowledge and enrolled in adult education classes in the Marina del Rey to learn Microsoft Word 2010, Excel, and Power Point. Of course, she was first in her classes and so far has three *Certificates*!

Footnote to page 38.

* "Memory researchers have shown light into a cognitive limbo. A new memory – the name of someone you have just met, for example – is held for just seconds in so in so-called 'Working Memory', as your brain's neurons continue to fire. If the person is important to you, the name will over a few days enter your long-term memory, preserved by permanently altered neural connections. But where does it go during in-between hours, when it has left your standard working memory and is not yet embedded in long-term memory?"
"… a research team shows that memories can be resurrected from its limbo. Their observations point to a new form of working memory, which they dub prioritized long-term memory (or I term '*Intermediate memory'*) that exists without elevated neural activity. Consistent with other recent work, the study suggests that information can be held in the synapses that connect neurons, even after conventional working memory has faded (*SCIENCE,* 14 March 2008, p. 1543*).*" By Jessica Boddy *SCIENCE,* Volume **354**, ISSUE 6316, p. 1036 and pp. 1136- 1139, December 3, 2016.

The lack of interim or *intermediate memory* does greatly improve my ability to "focus" and concentrated without "quickly forgotten" interruptions: I could study intricate Physics problems during very noisy fraternity turmoil at UCLA. On the other hand, the inability to immediately recall not only serves as an impediment to card and many other games, but even presents difficulties

in simple tasks such as typing, learning the ukulele, scanning, filing, and finding documents and the like. (It took me several months to learn on the ukulele "Five foot, two eyes of blue …" I flunked typing twice in High school and once at UCLA – non-credit, thank heavens). It is also difficult to search for things, like business files, I have trouble finding specific groceries, even finding Bonnie when she's shopping somewhere in a store, etc. I am told this is part of my "outstanding ability" to focus! Suppose I am looking for carrots. My "mind's eye" is narrow like laser beam -- I do not really "see" the radishes right next to the carrots. Another example is that it takes me forever to put a jigsaw puzzle together. Most people "see" or "recognize" a number of the pieces at one time (like a broad flashlight beam) – I "see" puzzle pieces one at a time (like a laser beam) without even realizing a puzzle piece adjacent to it!- I can only focus on things one at a time. I cannot, as they say "multi-task." Many years ago, in the 1970s when our daughter, Robin, was about ten years of age we purchased a "Holly Hobby House" for her. Problem was in order to assemble it I could not find "Part A1" to connect to "Part C7". Bonnie had to summon my dad to come over and calm my tremendous frustrations down! Essentially my *toolbox of skill sets* is limited because of my congenitally missing *intermediate memory*! During my faculty career at UCLA, I was often called an "absent minded Professor" – probably part of the same problem. Thank heavens that General Ritland assigned "Lieutenant Baker a secretary (Gertrude) since he also has trouble filing, finding (files), phoning and faxing and those tasks might take away from Lt. Baker's far more important time to follow our spacecraft!"

Bonnie is a natural leader:

Also, she is an excellent manager – but a bit controlling. Last October we were correcting all our clocks a day ahead of time for Daylight Savings Time. All were corrected ("Fall Back") except the pool control clock in our new Palm Desert home. Bonnie was adjusting it and asked me for the time. I said "6:48" the new time. Bonnie said, "No I want today's time not the new time!" I said, "OK its 7:48." Bonnie replied, "All right then, I will subtract one hour to make it 6:48– Thank you!"

As part of the lead up to the *LA Olympics*, Bonnie was MC at a gymnastics event. There was a gymnastics show that included our daughter, Robin (*Southern-California State Gymnastics Champion*). It was even broadcasted nationally on ESPN. An important dignitary showed up by surprise. Poor Bonnie struggled to remember his name and finally remembered it and avoided embarrassment. Speaking of embarrassment, although not a Bonnie story, I must relate a story about our daughter, Robin. She was in the finals of Miss Teenage Playa del Rey or Westchester (or somewhere – I can't exactly recall). She was number 9. Well, the MC announced the winner as number 29. The former Queen, who really liked our daughter, believed he said "9" and put the crown on our daughter and was about to bestow a bouquet of roses on her when our daughter was unceremoniously dethroned by number 29 who snatched away her crown and took the roses. Mortified is what we were! We all laughed! Here's Robin:

Robin Baker Fell, 2015

Bonnie also likes our Country's Military. When visiting Singapore in the 1970s an Aircraft Carrier (I think the *Enterprise*) was in port with about 5,000 sailors ashore. The restaurant where we lunched was full of these sailors. It took Bonnie an inordinate amount of time to return from the Girl's Room. She said that she had been waylaid by hugs and kisses – "Those Boys hadn't seen a girl in six months. "– Clearly not one as beautiful as Bonnie. Years later she actively processed our son Robbie's successful application to the *Naval Academy* in Annapolis (we really enjoyed visiting there). Prior to that we travelled for many years to the *Air Force Academy* in Colorado on teaching assignments. I was an Assistant Professor at UCLA at the time of our first visit to the Academy and given the effective rank of Brigadier General! Thus, we had great living quarters. The Academy had only been moved to the new campus from *Ent Air Force Base* a year or two earlier so all was

brand new. Bonnie and I were dining one day at the Mess Hall with several Air Force Officers. Bonnie said to them: "These Cadets are so nice and hardworking I would like to give a BEER BUST for them at our Quarters this weekend." Eyebrows went up – no cadet drinking was allowed and absolutely NO parties. Then one Officer at the Table turned to Bonnie and said, "What a nice offer – let's do it!" The other Officers were aghast – it turned out he was Academy Commander, and his word was law. The Cadets arrived, about 20 of them and they were perfect guests even cleaned up even our bathroom. The next morning Bonnie went into the bathroom to get her underwear. Where were they? We did not have time to think much about it since the morning parade was about to start so Bonnie secured a replacement underwear set. Well as we reviewed the Parade the Cadets did an "Eyes Right" in front of Bonnie and all the cadet marchers pointed to the flagpole where Bonnie's underwear was being hoisted up the flagpole. I'll bet that was an historical event – no doubt the first lady's underwear to be raised up the flagpole of the *United States Air Force Academy* – the event no doubt started a tradition there.

Common Sense:

Our minds are structures. Something like a house, we have "rooms," some empty and some not. In my case I have an "empty room" called an "*intermediate memory"* as discussed previously in a footnote. This empty room makes it difficult to play Bridge effectively and other games such as Chess. An *iPhone* computer could beat me at *"Texas Holdom"* poker so I seldom gamble. There is also *activity* in a "house" like *common sense* and being *consistent.* For example, when Bonnie is driving, she sometimes asks me which way to turn? If I say "turn Right" she turns Left. I am **consistently** wrong about directions and often get lost. One night we drove separate cars to a party. When I left, I drove off to the Right and found myself lost in the Hollywood Hills. I had imbibed a bit too much, so I parked by a *Phone Booth* and after trying unsuccessfully to phone Bonnie I took a nap. Today such Booths are almost nonexistent but were used to phone remotely in the "good old days." When I awoke, I went to the Booth and phoned Bonnie again at our home in Playa Del Rey by the Ocean. She had been extremely concerned about my whereabouts and I explained that I was lost somewhere and didn't know how to get home. Bonnie told me "It rained last night. Please look in the gutter and see the direction the rainwater is going." I did and then she said, "OK we live near the Ocean so just follow the water!" **That's common sense!**

Bonnie loves to travel:

We go as independent travelers and Bonnie plans our trips in infinite detail – even as to where to shop, get her nails done, eat our meals, etc. She accomplishes this

literally a year in advance. One of the most enjoyable aspects of our trips is to meet interesting people. We have met many people on our travels – no doubt because of Bonnie's enchanting personality and sincere interest in others. Recently we were in *Bhutan* on an Amman Journey (a string of luxurious chateaus). One nice couple, who Bonnie made friends with, were sitting next to us a cocktail time. The husband remarked "I love tequila, but this is terrible." To that Bonnie replied, "I didn't know that they would have proper liquor on the trip, so I packed a few miniatures of *Patron* in our bags …" (as I said Bonnie considers every travel detail!). "Let me get them for you." "You have *Patron* … fabulous!" the husband exclaimed. She brought three little bottles back and he was so grateful that he invited us to their place in Mexico City. It turns out that he was quite wealthy and part of the *Braniff Airline* family. His name was Juan Carlos Braniff, and his wife was Barbara (although of Mexican descent her mother named her after Barbara Stanwick); she was, I believe, the heiress to the *Dos Equis* beer family. They liked us and invited us to their place in Mexico City any time we might be there. They even insisted that we go out to dinner with them when we made our visit. On a trip the next year with Darien Iacocca (Liz Taylor lookalike) and Charlie Knapp we visited Mexico City (by the way, Charlie and I are experts on superheroes and know who Lamont Cranston and Dale Arden are). A limo (turned out to be an armored car). picked us up and took us to their estate. A giant steel gate opened -- inside were four guards with submachine guns (I guess he was important and a target for abduction). Anyway, we entered an elevator with another armed guard, and it delivered us to their subterranean residence, and they hosted us to dinner. We entertained them when they were in LA at the BABC (where the parking attendant said "Oh! You are the Mexicans Mrs. Baker told us to let park here." Of course, 90% of the help is "Mexican."). We also met them in Puerto Vallarta, and we remain good friends with Juan Carlos to this day.

While at the ***Hotel Cipriani*** in **Venice** (I think that was the place), Bonnie befriended the Italian Ambassador to Guatemala. He invited us for cocktails. It was late, the Bar was nearly empty, and Bonnie noticed a couple sitting alone in a corner. She suggested that we invite them over and the Ambassador went to their table. They started arguing about what champagne to order: *Dom Perignon* in or *Piper-Heidsieck* Champagne. They finally chose *Piper-Heidsieck* Champagne. Guess what … the old gentleman **was** Piper-Heidsieck! … And he invited us to his place in the South of France – darn it! I lost his card, and we missed out on his invite. On another occasion, it was our daughter's 25th birthday and we were celebrating it in Paris where she had spent a semester abroad while attending *UC Berkley* a few years before. She had now started a company that displayed children's videos at the *Cannes Film Festival*. So, she traveled to meet us in Paris. We went to one restaurant in Paris that she recommended, but no diners were present, and Bonnie suggested

that we find another restaurant. We found one called "Le Boeuf Sur la Toit" (or something like that?). Our daughter had arranged to meet a fellow American (a *Time-Warner* young executive) at another restaurant and she phoned him. The three of us sat at the bar before our table was ready. Bonnie immediately engaged the French couple next to us in conversation. Our daughter whispered to her: "**Mother!** You do not know these people so why are you talking to them? You should not be so forward in France!" Bonnie replied, "Why don't you return to that other restaurant and collect your friend and bring him back if he is there?" A bit disgruntled our daughter left the Bar and Bonnie continued her conversation with the French couple. They inquired about why we were in Paris and Bonnie told them that it was to celebrate our daughter's 25th birthday. She returned (her friend never showed) and we were seated for dinner. At desert we were amazed to hear Bonnie's' new French friend stand and addressing the entire restaurant he said: "I want to propose a toast to the Baker's daughter, Robin Baker, on the occasion of the 25th birthday." He raised his glass and the entire restaurant toasted. I sent them a bottle of champagne and invited them to our table. Upon arrival he invited us for lunch the next day at the *Plaza Athene* and Bonnie quickly accepted. He then presented us with his card. I must say it was the largest business card I had ever seen! And who did it state he was? Bernard Vuitton the grandson of Louis Vuitton!

Chef Bonnie:

"The way to a man's heart is through his stomach." The saying goes – so why not to a woman's heart? While we were dating, I would ply Bonnie with 25-cent Chicken Pot pies. Working girls don't have much time for fixing elaborate meals and Bonnie loved the pies. Soon after we were married Bonnie settled on a standard meal when we entertained at dinner. It consisted of Cornish Game Hens and Wild Rice. Our freezer was filled with frozen Cornish Game Hens and our cupboard chuck full of boxes of wild rice – ever ready for a dinner party. Soon Bonnie (or our guests) tired of our "Standard Meal." Bonnie began to experiment with various recipes. She was very inventive here and one day decided to submit them to a recipe contest. Well, she won and was published in the *Better Homes and Gardens Cookbook* and later in the *Neiman Marcus Cookbook* – twice! I felt her feeling of success when I found all of her new stationary inscribed with "***FROM THE KITCHEN OF BONNIE BAKER***." By the way, Bonnie's bread-cooking culinary skills came in handy when *she developed an analogy to it for our development of the "speed of time" and the rollout of our early Universe, discussed in Chapter 9 (by the way, she also suggested that time, like space dimensions, had a "speed").* Her cooking is still superb. While in India, while on a river cruise in Burma; at the Grand Hotel a Villa Feltrinelli, while on Lake Garda, Italy and in Mexico she was a *guest chef*. She has cooked and

taken cooking lessons all over the world! Bonnie also has a voracious appetite. It is a miracle that she keeps a Marilyn Monroe figure after decades of consuming wonderful food – much of it being her own creation. One day while watching our son Robbie pitch at *Little League* (he was an award-winning left hander) she went to the food Booth with her old pal, Marilyn Smith and asked to buy a big jar of Red Vines. The girl in the Booth said, "How nice of you to buy these for the whole Team!" Bonnie responded: "No. Actually they are just for me." I really doubt if there is any major city in the northern hemisphere with shops that Bonnie has not visited – I believe she has run her hands through almost every stylish clothes rack on this side of our planet! Bonnie should have been a lot of things: a famous chef, a decorator (our BABC Cabana had been given every prize), a movie star, a travel consultant for the rich and famous and certainly a fashion designer. She has exquisite taste and a fantastic eye for clothes. Once in China we were with a group of people and Bonnie found a very unusual hat (really a crown). Everyone asked exactly where she found it. "Well," she said, "back there … you all passed it." In Vietnam she has had clothes, which were designed by her, made up by them – even including shoes!

I mentioned her stint as docent at the *LA Museum of Science and Industry*. Well, that was just a very small part of her charity work over the years. When we first were married in the 1960s, I was active in Aerospace and felt that our Nation's biggest problem was our lack of educating competent scientists. I recommended a then new charity the *Achievement Rewards for College Scientists (ARCS)*. Bonnie joined and was extremely active, bringing in millions of dollars and organizing about a dozen elaborate galas including *Pauley Pavilion* during our Olympics, *Playboy Mansion*, the *Los Angeles Train Station* and *Paramount Studios*. Please look at: http://www.drrobertbaker.com/arcs_gala_2006.htm

She also was a member of the *Nine O'clock Players* of the *National Charity League*. It presented plays, like the *Wizard of OZ,* to young children. Well, you would expect a beautiful extravert like Bonnie to be on stage – but "no", she elected to be a Stagehand. She followed my mom into the *House Ear Institute*, was a *CHIP* (Colleague Helpers in Philanthropic Service) in the *Children's Institute*, and a member of the *LA Library Foundation, Blue Ribbon, Foot lighters* and *Les Amies* among other charitable activities. Whatever she joined she put her heart and soul into it – charity to others was Bonnie's Religion it's her Golden Rule!

In fine, Bonnie is a brilliant actor who requires no audience! Well, the saga of Bonnie is destined to go on and on; but remember one thing: **don't touch her left toe!**

CHAPTER 7

I Believe in Immortality!

I believe in immortality: but not in the usual sense of the words – I believe that we "live on" through our genes, through our offspring. I would like to characterize very briefly our offspring now (2018). I recognize that they are also the product of Bob Fell and Wendy Berman; nevertheless, I will still allow myself to be prejudiced to Bonnie's and my side of the family. In order of their appearance my offspring are:

Robert Randall Baker (much like me). Randy went to the *Principia High school* in St. Louis. The whole family attended his graduation. Robin and Jan's daughter Joey felt they are sisters and were pals. Randy is a philatelist and a numismatist. He was a good woodcrafter and was a Christian Science Practitioner.

Robert M L Baker, III (a combination of me, Olie Vold and, especially, my dad – more about him later)

Robin Michelle Leslie Baker Fell (the best parts of Bonnie and her Grandmother, Martha Baker—more about her later)

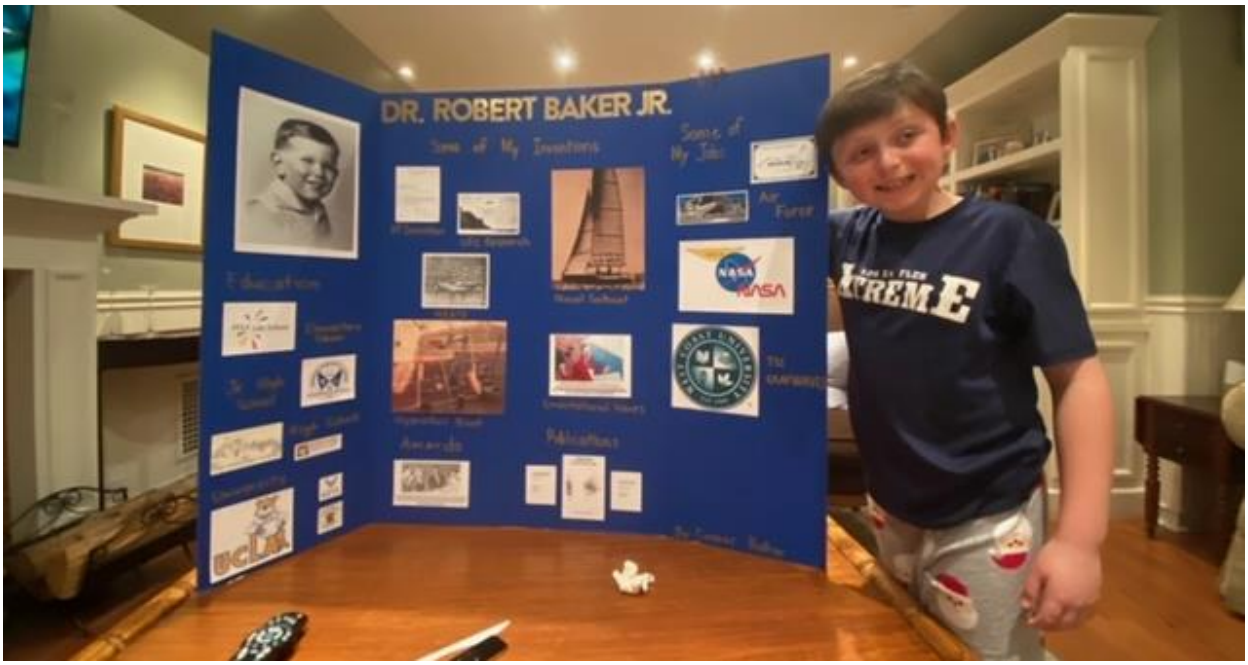
Alexander Robert Fell (much like a son of mine, a real pal – you can view a skit of ours when he was 11, on my webpage www.drrobertbaker.com under PICTURES page 3, 6th photo or CTRL-Click: https://youtu.be/6G4WYErciMk Also take a look at the *Saturday Evening Post* Picture in Chapter 5. A fabulous singer – sang at Carnegie Hall!). At this writing Alexander had just been accepted to Dartmouth (2019) to study "Business" and, like his Dad, Bob Fell, will surely be a great Business success!

Harrison Fell (like me [argumentative, but unlike me he was never sent to his room because it] and somewhat like my Uncle George Ross – a math professor who lived in Washington, DC). Harrison is a "Dean of debate!" He studies a subject thoroughly prior to debating it. For example, "Global Warming." We commenced debating it and Harrison introduced "… the 1912 theory of the Serbian scientist Milutin Milankovitch linking the ice ages also to the gradual

cyclical change in the eccentricity (shape) of the Earth's orbit." Wow! Probably far less than one percent of those involved in the "Global Warming" controversy know that this is where the "pre-industrial" 2 degrees Centigrade per century inevitable source of Global Warming" comes from! But Harrison does!! Harrison may well be a Genius!

Tyler Baker (Like Robbie AND my Uncle Ty Baker), great baseball player! My dad was the main pitcher for the UC Berkeley baseball team! I only wish I had kept his pitcher's mitt. Tyler is an outstanding pitcher (pitched a "no-hitter" you can view it at: https://youtu.be/0ICPtb3U4fg) and was an "All Star" in Little League. His Far-West traveling Team won the National Championship in 2019 and he became an *All American* in Little League!

Conner Baker (a tough one to decide, but like Bonnie, me, AND my Uncle George Ross, also very curious – the mark of a scientist!). One day Conner, now about 6 years old, asked "Grandpa, how are clouds able to float in the air?" Then a little more recently "Grandpa, what is the formula for the volume of a sphere and who figured it out? "$(4/3)\ \pi r^3$ figured out by Archimedes about two thousand years ago – he also figured out the displacement of an object in a fluid—OK Conner?" Next at 7 years old, I receive another call from him: "Grandpa how do you know if a star coming towards Earth or going away?" You use something called the Doppler Shift – "Yah, my dad told me that; but how does it work?" I told him it's like running into the ocean with or against the waves and the resulting frequency that the waves hit you – then about the pitch of a train's whistle as it approaches/recedes from you and the red shift of stars and galaxies, etc. "Got it! Thanks grandpa." The best however, was when he was 9 years old he impersonated me and introduced himself to his Third-grade class as "Dr. Robert Baker, Jr." You can view it at https://youtu.be/M_N3Y3PPAu8. It was a "poster Presentation" and the background noise is from other 3rd Graders simultaneously presenting their own Posters.



Note on Uncle George Ross: Although not a PhD he was a brilliant mathematician and instructor by many in Washington D C in the 1920s -1940s (I think he was at *Georgetown University*). He also was a "quick talker." He was the brother of my Grandmother Ethel Ross Harlan. In the 1940s, when my folks brought me along to Washington DC (Dad was being sworn in as a *Supreme Court* Advocate or something?) Uncle George took me to the US Naval Observatory (now the Vice President's quarters). He knew the Director quite well and occasionally lectured there on mathematics. Uncle George was great at a lot of things, but driving was not one of them. On the way, he drove right over a Highway center divider and remarked to me "These DC roads are getting bumpier and bumpier!"

Tyler, Harrison, Alexander, Conner and me, 2012

Bob & Alexander, Vaudeville Link. They call themselves the "Booby Brothers" – the "Booby" is a bird found in the "Galapagos" Islands that Alexander and I viewed in 2013. Please see: https://www.youtube.com/watch?v=vUGJUTFOe7Y

In a little more detail on Robbie and Robin:

Robbie is amazingly like my dad. My Dad was pitcher for *UC Berkeley* and Robbie most valuable player for *Harvard School* and pitcher for the *Naval Academy*. He graduated from *UCLA* and received a Master of Laws (LLM) from *Boston University* and shared the top of his class honors with Sam Landis. Also, Dad was the LA champion Badminton player and Robbie a tremendous Pickle Ball and Paddle Tennis player. They both love and are extremely proficient in math and legal matters as well as being great followers of sports. Both having "somewhat" red hair ("at its roots" – a little humor there) their temper is a bit sharp. In fact, like Bonnie's Dad, Ole Vold, they are always prepared to fight verbally and, if necessary, physically. Robbie attended *Harvard (Military) High School* as did I. He "visited" the UCLA *Phi Psi* house, but after a "thorough" analysis, pledged *Sigma Nu*.

Robin is an amazing athlete – Sothern California State and CIF Gymnastics Champion (First Place) – only a fraction of a point from our Olympic Gymnastics Team. Like Robbie she is also "smart as a whip." She straightened out the *Kappa* House at *UC Berkeley* and amazingly enough graduated from there a strong CONSERVATIVE! Started her own company, *Emerald Entertainment* and is a part-time inventor. She should also be selected as "MOTHER OF THE DECADE" what a fantastic, all-consuming job she is doing with her kids! AND she is a chip off her grandmother- Baker's block! As far as some other inherited traits are concerned, the athletic and sports genes complete missed me. Also, the interest in Law that my Grandfather Mel J. Baker, my dad, and Robbie professed, completely passed me by! Here's an example from the BABC of a lost athletic gene. My grandkids were at the Bel Air Bay Club one day and said: "Grandfather, Grandfather, we see trophies listed on the wall and you and your dad won the *Father and Son Paddle Tennis Tournament* three times in a row!!" I had to confess that during those BABC Tournaments my dad would tell me at the beginning of each game "OK Bobbie, just serve the ball and sit on the bench out of my way!" As I mentioned my dad won the Los Angeles Badminton Tournament at least twice. Dad was small, but really, really quick and beat the other father-and-son-double contestant's single handed! My fear was that the BABC would resurrect a "Father and Son Tournament" and that son Robbie would tell me "Dad just serve the ball and sit down!"

Hey! Wait a minute: speaking about "a chip off the block" or family heritage; how about Bonnie and her mother Rose Miller Vold – see where that smile came from!

Bonnie's Mom

While we are discussing family matters, allow me to add another funny story. It is from the 1978 Science Fiction movie "Capricorn One" or probably from the movie's writer, Peter Hyams.

One brother had been out of town for several months and phoned his other brother living at home. “Hi! How are things going, especially how is my cat?” The other Brother replied: “Sorry, your cat died.” The calling brother said “**WHAT!** That was my very favorite animal. Why didn’t you tell me in a gentler way? For example, say that your cat was on the roof. He slipped down to the gutter. We called the Fire Department, but he fell off. They took to a nearby veterinarian who worked desperately to revive your cat, but alas your cat passed away” --- “Oh, sorry and I do understand – I should be gentler.”– “So how is Mother?” -- “Well Mother was on the roof …”

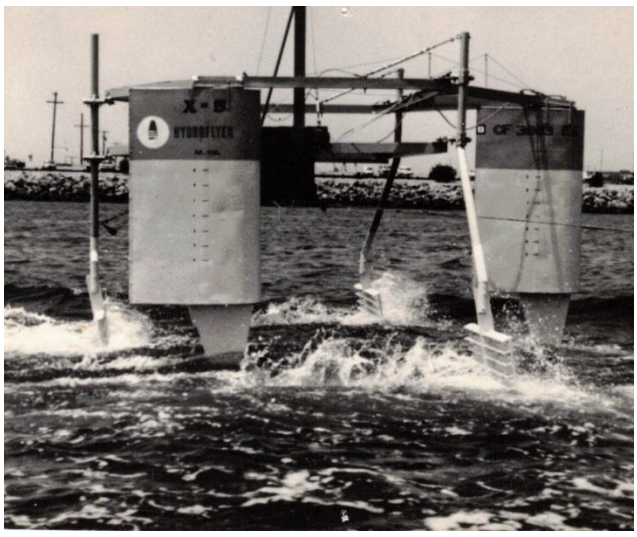
CHAPTER 8

Stock Options?

What are stock options? I thought: Lockheed had decided to move all their Aerospace activities up to Sunnyvale including LARC, but I wanted to stay in Southern California. I was offered a job at a new Aerospace/Technology startup, *Computer Sciences Corporation* or CSC as Associate Manager for Mathematical Analysis. What a good opportunity! Problem was, the salary was very low to the point that my bride, Mrs. Bonnie Sue Baker would need to continue working (at *Planning Research Corporation* now and *Astrophysics Research Corporation* later). To compensate for the low salary, they offered something called "Stock Options." The idea was you had the option to buy CSC stock at today's price in future. If the CSC stock price went up a lot, then you would make a killing! OK!

***4444 Via Marina, Penthouse P88*:**

Back from our1964 Honeymoon in Hawaii, we moved into our brand-new Apartment in the Marina del Rey! We had beaded curtains, a wolf rug, overlooked an Olympic sized pool on one side and on the other side were the *Bay 1* boat slips of the Marina. Perfect place to assemble the *Hydroflier* pontoons that I had under construction in our living room! (Another invention I was working on.)



Hydroflier in Operation in the Marina del Rey, 1979, under Radio Control

We had a great time in that apartment. Bonnie loved to entertain there. My folks 40th Wedding Anniversary, lots of my folk's friends were royally entertained. Our next-door neighbors were George and Sandy Schussel

. He was a brilliant MIT PhD and worked for *Northrup* (as far I can remember, that is). One evening we decided to play a trick on them, and Bonnie climbed over the railing to their apartment, and we got into their bed. Something like "*The Three Bears"* when they arrived it was "who is sleeping in our bed?" Bonnie is very agile – another different time we were in Cairo in a bedroom overlooking the Pyramids. The door malfunctioned there was no phone except in the un-reachable entry room. Agile Bonnie again climbed across a railing and called the Manager to come to our room. We told him that the bedroom was trap – malfunctioning lock. He said, "No way, that lock is brand new!" I suggested that he go into the bedroom and check. He closed the door and could not get out! I told him that "I will let you out, but first let's talk about our Hotel Room rate."

A gambler's good plays in Playa del Rey:

About three houses down from our home lived Carroll and Sandy Shelby. He was initially well known for his 1959 win at Le Mans and later, having won a chilly contest in Texas, *Shelby Chilly*. More recently, the *Shelby Mustang*. Anyway, he had a great Bar overlooking the Marina del Rey. (Later on, a movie, *Ford Versus Ferrari*, chronicled his life.) Chairs around the Bar equipped with safety auto seat belts and most wonderfully, a slot machine. Unlike those in Las Vegas **it gave back 5%!** I had noticed Son, Robbie, leaving our home every so often carrying a bag of quarters. I didn't think too much about it until I received a phone call from Carroll: "Bob, would tell your son to no longer come into my Bar and keep collecting coins from my slot machine!" I began to really appreciate Robbie's prowess at gambling, when Bonnie I were driving somewhere and noticed Robbie in the rear-view mirror carrying a little carousel of poker chips across the street to Dr. Don Rosecrans house. The next day I received a phone call from the good doctor: "Bob last night I hosted a poker party with some of the neighbors including your son …" I cut Don off by saying: "Don, do not worry I will make good any of Robbie's losses!" "NO" Don said, "Problem is I owe Robbie $200 and I will pay him later today!"

About this time, I was surprised to receive an award from none other than **Ronald Regan**. He was soon to become Governor of California, then President of the United States. What I am explaining is that he presented me with the award **before he became extremely important!** Anyway, the award was really appreciated. I added

another photo below, taken four years later when we enjoyed dinner with “Ronald and Nancy”!

STINGUISHED SERVICE — Dr. M. L. Baker, ro-dynamacist with UCLA and Computer Sci- e Corp., was presented annual Distinguished Service Award of the Westwood Jr. Chamber. At presentation were, from left, Bill Kamenar, chairman; Dr. and Mrs. Baker and emcee Ronald Reagan.

<u>February 1965 Junior Chamber of Commerce”1964 Man of the Year” Award to Robert M L Baker, Jr. Presented by Ronald Reagan (Left to Right: Robert Baker, Bonnie Baker, Ronald Reagan and Nancy Reagan)</u>

I agreed with Ronald Reagan, "BIG government is not the Solution it is the Problem!" So I support any political party that promotes smaller central government (a strong military excepted), cuts regulations (requires BIG government to enforce) and especially cuts taxes! I believe "Taxes feed the BIG

central government MONSTER and cutting them encourages small government and allows us to spend what we earn as we, as individuals, desire!"
As Ronald Reagan told me, "… whatever you call it, Socialism, Communism, Capitalism, Fascism, the bigger and more controlling a government becomes it will dissolve into autocracy and oligarchy"! Powerful government comes to power for all the right reasons: help the needy, protect the "little man", regulate the environment, preserve our planet for future generations, charity for the poor and disadvantaged, prevent crime, provide healthcare, graduate education and especially a good "living wage" for everyone to allow anyone who works hard to succeed, etc., etc. THE BIG GOVERNMENT WILL TAKE CARE OF IT -- WE PROMISE!!! Then guess what? The BIG government attracts a strong and powerful – often ruthless, leader: a Stalin, Mao, Pol Pot, Hitler, Mussolini, *et al.* As the proverb goes: "The road to Hell is paved with good intensions." The more dependent we are on Big Government, the less we are on ourselves and regression to a repressive and depressive life becomes inevitable!

Article I, section 8 of the U. S. Constitution grants Congress the power to "lay and collect Taxes, Duties, Imposts, and Excises, to pay the Debts and provide for the common defense and general Welfare of the United States." It's the "*General Welfare*" where interpretation means everything!
Here are a few synonyms for "Welfare": Happiness, luck, easy street, profit, satisfaction, success, health, well-being, contentment, euphoria, etc. Almost anything you want it to be! (In this regard, please see the spoof: "BONNIE-BAKER FOR PRESIDENT" at the end of Appendix I.) There are some bounds to "Common Defense," but not really to "*General Welfare*."! So our Constitution does not constrain our Government and politicians can promise anything to attract votes. President Herbert Hoover had promised voters a chicken in every pot and two cars in every garage during the campaign of 1928. Recently (2020) some presidential candidates promised regulations to eliminate hydrocarbon emissions, to insure healthcare and a free college education for everyone. Therefore, there is a clear and present danger for our government to grow without limit and a despot to take over -- history is our guide. So we should pay attention to Ronald Reagan and avoid BIG government! There is a corollary here: Big Government can lead to SLAVERY! An example here is Lyndon Baines Johnson's *Great Society*, which was extended by President Nixon. One of its purposes was to eliminate poverty. Its *social safety net*, designed to be a temporary help to the people in need, instead kept them trapped in government dependency! According to Shelby Steele (an African American scholar) statistics show that one of the unintended consequences was the increase in fatherless African American families, especially in Chicago, to 75% -- most of which were government dependent. Essentially the root of the deadly "Black-on-Black" crime

there in the 2000s – the loss of the nuclear – Mom AND Dad family! Big Government thrives on increasing dependent people and hence promotes "Open Boarders." Such dependency is the most insidious form of SLAVERY, like a narcotic one becomes addicted to it and to anti–social activities. According to Steele: "…97% of young African American murders are NOT by Police, but mostly caused by other African Americans!" Any opposing political party, which might challenge their dependence on Big Government, incentives their violent behavior to destroy it – "protect your drug dealers our elected officials!!!"

1989 Ronald and Nancy Regan and Bonnie Baker

I felt so strongly about this that prior to the 2020 election I posted signs on our yard in Palm Desert: They lasted only **one** night since some ardent Liberals trespass into our yard and stole them!

While discussing politics, specifically Presidents and Commander and Chiefs, I must give my preference for a gruff, rude, egocentric yet bold, decisive Commander like General George C. Patton to lead us rather than a gentle, kindly one like say, the General of the Salvation Army!

Back to my story: I got moving at CSC in the 1970s – especially with my "great reputation" in Astrodynamics (and the foregoing "endorsement" by Ronald Regan). I was able to secure CSC's first contract with NASA at the *Goddard Spacecraft Center* (GSFC) in Greenbelt, Maryland. Next, I obtained CSC's first contract with the USAF at the *Air Force Rome Air Development Command* in Rome, New York. An interesting lesson I learned there. During my search for CSC business, Bonnie and I visited the Rome Air Force Base. Besides extracting a lady Air Force Major from a snow drift upon her shakily exiting the Base Officers Club, we visited their *Over-the Horizon Radar* facility in a big dome at the Base. I was excited to hear that they were using one of my textbooks. How proud I was to have my work utilized in their TOP SECRET (now declassified) and vitally important to our National Security projects! "Dr. Baker, to point our radar here, we utilized Equation 4.51 of your *An Introduction to Astrodynamics, First Edition.* We turn our radar on and it quickly rotated 180 degrees away from our target satellite*!* Is there an error in your equation?" Good grief! There was: a minus sign was missing (corrected in the *Second Edition)*. Lesson: don't be so hubris about your work until it proves to be correct when practically applied!

I worked directly with Vince Grillow, head of CSC's Marketing and the CSC's President, Fletcher Jones. Great experiences including lots of travel. On CSC's stationary it showed that we had an Office in London on Bond Street. I decided to visit it on one of those trips – but *good grief!* We had **no** Office there – someone told President Jones he had started such an Office, but he never did set it up– that fellow was quickly terminated. On another trip we visited Goddard Spaceflight Center where CSC might put me in charge of our facility that we now had going. Bonnie and I were lost by Oak Creek Park near the White House. Two thieves suddenly jumped in on both sides of our car. Bonnie screamed "Don't you dare touch me I'm married!" *And showed her wedding ring to them*. Far too easily I pushed my assailant out our car and Bonnie did likewise. I began to start the car and get out of there, only to discover the thief had taken the keys – he was off balance doing it and that's why I was able to easily kick him out of our car. Bonnie yelled some expletives at them and told them to "… give us back our keys!" They threw them down. Bonnie said she was the quickest, took off her shoes, jumped out to retrieve the keys. They grabbed her and started to drag her along the gutter. I now believe in the "Incredible Hulk!" I jumped out of the car so fast that I left one of my shoes behind, chased them and grabbed one of them so hard that I still had part of his torn off coat in my right hand as they ran off without Bonnie. I refused the Goddard job and took Bonnie to Miami Beach to recuperate – she had an infection from being dragged down the gutter!

TOP SECRET, SPECIAL ACCESS REQUIRED: AT&T had been broken up by Court Order and CSC's President Jones had decided to buy one of the splinter companies of AT&T for CSC. The new Company was working on some unknown government program but was making good money so Jones sent me to Falls Church, Virginia to find what they were doing. "I'm here representing Mr. Jones, President of CSC, and the company that just bought you." The receptionist replied" Well, Dr. Baker, I see you have a TOP SECRET clearance – that's not enough for you to gain access!" I immediately flew back to El Segundo and told Fletcher. He picked up the phone and called the President of that "more than Top Secret" Company: "I am President Fletcher Jones and now own your Company, if you do not allow Dr. Baker iinside,I am disbanding your Company this afternoon and immediately stopping your salaries – do you understand me? "Yes sir, send Dr. Baker back, he will have full access to everything we do!" I found out that they worked for the National Security Agency (NSA) and had just developed a computerized system to type up and analyze intercepted verbal conversations something like "Dragon Naturally Speaking," but with an analyses system to create alarms if talk of nuclear weapons, terrorism, etc. was overheard – in addition, they had developed sophisticated voice ID system.

***Aren't you going to pose the cat Dad?*:**

Our cat became ill. The Vet said she needed a hysterectomy. I inquired as to the cost "$500" what are her chances if we don't operate. "50-50 chance she will die!" -- "I'll take the odds". The vet gave me some pills for her to take each day. About that time Bonnie left for a work assignment in Canada. Now **I alone had to nursemaid our cat!!** About the second day the cat decided she didn't like the pills and hid under the bed – well in my valiant effort to get that pill down the cat's throat I inadvertently croaked her. What to do? Of course, I grabbed the cat by her tail and carried her outside to dispose of her in the garbage can; Good grief! I was intercepted by Robbie and Robin (ages 9 and 6)! "What are you doing with our cat Dad?" When they observed the deceased cat they broke into hysterics. "Kids: what would have me do with cat?" "A funeral – yes we must have a funeral!" I found a wooden wine box and stuffed the cat inside that nice casket. **"Wait! Wait! Dad you must carefully pose our cat prior to burial!"** Although not a cat mortician I carefully arranged the body and nailed down the tiny lid. Having dug a little grave in our front yard I placed the box gingerly in the grave. But the kids were sobbing. "What now?" I complained? "You must read a passage from the Bible!" I found the family Bible (How could Bonnie leave me with this disaster? I thought). Now where in the Bible is a passage for the burial of a cat? OK I found: "Yea, though I walk through the valley of the shadow of death, I will fear no evil: for Thou art with me; Thy rod and

Thy staff they comfort me." Reverend Baker was now absolved from all of his cat sins!

***AOP and the US Congress*:**

I was introduced by my Congressman, Alphanzo E. Bell, Junior. You guessed it – his father started Bel Air and the BABC! As I said in Chapter 4, in the 1950s I was the "go-to" scientist for UFO films – now in 1968 my past caught up with me and I was testifying before Congress! I couldn't turn down Carl Sagan's invitation. They all wanted to hear about Unidentified Flying Objects (UFOs), but as I told them: "Many of the photographs were not Unidentified (we knew what they were, e.g., meteors or satellites) … many were not Flying (e.g., spurious camera reflections) … and many were not real Objects (e.g., mirages) … so I preferred the term Anomalous Observational Phenomena or 'AOP'". I don't think Chairman Roush (Chairman of *House Committee on Science and Astronautics*) bought it! Upon return to CSC, Fletcher called me into his Office – I expected kudos for my Congressional testimony "Bob, do you realize CSC has a clipping service that charges us for clippings? Well, there have been thousands about your UFO testimony, and it is really costing us – so no more UFO talk!"

The CSC stock price stalled, and CSC was now a "mature" company -- with President Fletcher Jones just killed in an airplane crash – it was time to move on.

CHAPTER 9

University Days Part 2

I had been since the 1970s on the Board of Trustees of a small, non-profit University dedicated to the education of working adults *West Coast University* **(**WCU**).** My best friend's dad, Fred Nason Senior (also a client of my father and President of *Beverly Hills Transfer and Storage*) was the Chairman of the Board. Mr. Nason brought me on the Board in about 1975. Now WCU was experiencing a big financial difficulty. Mr. Nason wanted me to take over as interim President. After going over the offer with Bonnie, I accepted the interim presidency in 1980 just after leaving CSC. Since WCU was on the verge of financial collapse my salary was meager – and pretty much stayed that way. Bonnie still had to work – now as a word-processing trainer. Thank heavens for Mom and Dad who really helped financially with the kids! I guess I was right, I will never make as much money as my dad. I thought each generation in America is supposed to prosper more than the last -- but maybe to "prosper" does not necessarily mean to make more money! But as actress-comedian Mae West famously said: "I've been rich and I've been poor, but let me tell ya, rich is better!"

During my graduate years at UCLA, and especially while fulfilling the Engineering core course requirement, I had taken some courses on management, but certainly not a sufficient preparation for my new "executive" task. I did recall the "management movie" *Twelve O'clock High"* (1949) in which a new commander came on to an Air Base. That was my only real guide! The only thing that saved me was that the Business Plan of a University was unlike that of a Company. In short, the faculty runs the University, the President raises donations, and the Board of Trustees oversees everything. But for WCU the situation was different too!

I totally got rid of the previous President (lesson learned from *Twelve O'clock High*). Then I picked up a stack of 3 by 5 blank cards and interviewed every single executive and every faculty member. There were several hundred, so it took a while. I ask each what they were doing, what they would like to be doing and did they have any suggestions? I would then put my brief evaluation of them on the back of the card. By the way, I had a terrific new secretary or Executive Assistant, Pat Specks (a "New York Secretary"). She endeared herself to me when I first came into the University's

parking garage: “No Dr. Baker, do not carry anything to your office yourself – we have others here that I will direct to accomplish that for you!”

I had hypothesized that WCU’s Business Plan was apparently developed at the start of the “Cold War.” Aerospace/Defense companies had a great shortage of technically qualified personnel. They had lots of personnel, smart they were, but not technically qualified. *West Coast University* had the solution: send us your people and we will get them qualified either in after-work night classes or in-plant courses. Furthermore, we will expedite the learning process NOT by using the usual “standard” university faculty – No! WCU offers “practicing, professional professors” (P^3 I called them) that are up to date on just the technology that is needed! Then why was WCU in financial difficulty, I wondered? The reason was, as I saw it, that WCU was using the conventional-university Business Plan not the after “Cold War” plan indicated above that I had surmised! The faculty was too busy “running things” and the “administration” was, in fact, lazy! Most universities had something called “tenure” for Associate and full Professors. Essentially, *tenure* had been set up so faculty could not be fired (even if they taught a very “light load” – unfortunately encouraged by the Faculty Senates) if they lectured on non-mainstream – called today “politically incorrect” -- subject matter. But basically, it was a license to never be fired unless you behaved inappropriately with the opposite sex (here faculty and students were essentially guilty until proven innocent!) Time for a change!! Big, Big problem that stood in the way was the Accreditors: *Western Association of Schools and Colleges* (WASC) -- it was a champion of the conventional-university business plan!

I eliminated tenure, downgraded the Faculty Senate, fired all those that I believed were lazy, BUT hired C. B. Gambrell (“CB”) as Provost, who I had learned was a favorite with WASC and, as a matter of fact, was a leader of the *Accreditation Board for Engineering and Technology* (ABET). I then made an appoint to meet directly with WASC near Mills College up North. CB and I plead our case and our accreditation was extended. I also had an “in” with Secretary of Education William Bennett and secured an appointment until 1989 on the *National Advisory Committee on Accreditation and Institutional Eligibility* of the Department of Education. This was the Committee **that approved our approver: WASC!** I had now secured accreditation with WASC and ABET, and our enrolments started to really grow and finances also way up! Mr. Nason then wanted me to permanently stay on as WCU President and I agreed.

Speaking of Secretary Bennett, he really attempted to promote WCU since he believed it was the educational means of the future. Through use of a TV link, which Bennett arranged, I was to award a WCU Master of Science degree while our

graduate was in SPACE! It was to be accomplished in 1986. Horribly it was not to be, due to the Space Shuttle Challenger disaster!

During my second year at WCU Son, Robbie, was a Plebe at the *US Naval Academy* in Annapolis, Maryland. He told me their Calculus Class was difficult for him. So, I flew out to Annapolis to help (I thought of going on WCU business, but it wasn't so I didn't and paid my own way). Like the *Air Force Academy*, it was not difficult to enter since I had credentials as a University Faculty member. I was showing Robbie some differential equations on the blackboard, when one of the Academy Instructors entered. "What is going on here?" Robbie answered, "It's my dad he's a UCLA Professor and runs a small university – he is here to tutor me in Calculus." The instructor shrugged and said "I guess it's Ok..." Then, as he walked out the door, he was shaking his head – apparently still mystified by my presence.

***More about the Naval Academy*:**

In 1983 for the first (and probably the last) time the Army/Navy game was held in Los Angeles. In fact, Robbie was featured on the TV Program *Two on the Town*. What would Bonnie do? Like her Cadet party discussed in Chapter 6 -- have a BIG party of course!! All 200 of the Plebes were invited to our Playa del Rey home. We had three Bars and donated hors d'oeuvre and liquor from our friends. It was a great Party until descended upon by the "girls." The Movie "*Officer and a Gentleman*" had just come out the year before and all the young girls in town wanted those "…young, handsome** cadets who had their first job guaranteed!" Well, there were so many that our pictures were literally coming off the walls and Bonnie stood up a declared "**THE PARTY IS OVER!!!**" How very, very peculiar for Bonnie: NEVER nor after has she EVER CLOSED DOWN one of our parties!

**Footnote to pages 56-57: I originally miss-spelled "handsome" phonetically as "hansom." Monica Panno caught it! The error was due to my awful spelling cited in Chapter 1. But spellcheck didn't find the problem since "hansom" is a correctly spelled word meaning: "a two-wheeled horse-drawn carriage accommodating two inside, with the driver seated behind." It's like a one-horse shay, which reminds me of the old story about the newly married couple returning home from the wedding chapel. As they started out the horse stumbled, and the Groom said to the horse "That's one!" Well, the horse stumbled again and the Groom said, "That's two!" Just as the shay came to the married couple's new home the horse stumbled again. The Groom said: "That's three!" Jumped out of the carriage and shot the horse dead! Well, the Bride said to him "Why did you do that?" and the Groom said to her "That's one!"

Striptease:

Not all girly shows are on stage in Las Vegas. Every year or so the charity, *Achievement Rewards for College Scientists* (ARCS) has an "away" function – this time to Las Vegas. We had a suite together with Monica and Guy Panno. It turns out that the suite had a central spa with glass sides. On afternoon Bonnie and I were having an afternoon nap. We turned off our bedroom lights and got ready to doze off when low and behold the Panno's appeared in the still illuminated central spa – no one there could see us in our unlighted room, but Monica and Guy were in full view and nude. Bonnie and I fluffed up our pillows laid back and watched the "show"! Speaking of Monica, when she was single (and on the lookout for handsome** available men) we were on another "away trip" this time to the wine country. As I have indicated I have no athletic capability. One of the features of this flaw is my total lack of balance (how Robin become State Gymnastic Champion is beyond me!). Therefore, operating a bicycle is very tricky for me. Anyway, Monica, I and about a dozen others were bicycling through the vineyards – Monica on my side the rest close by. Well, I saw this fellow eyeing Monica "That fellow is really looking you over, Monica." --- "Where is he?" and as she looked for the ogler, she pushed into my bike. Of course, I pitched over and "like dominos" so did the rest of the close by cyclists. I don't know what happened to the voyeur; at least be didn't participate in our little disaster.

"Listen Dad, you are being really hubris – If you don't quiet down, I am going to stop filming!"

WCU was building up a good international reputation – especially in Asia. A former WCU graduate, Dr. Victor King was our best proponent, especially in Taiwan – a nation just off the Chinese coast. There were many fantastic trips that Dr. King arranged. One of the most exciting was to Hainan Island Province in P. R. China the trip was at the invitation of the Governor. It is filmed on my Webpage (https://www.youtube.com/watch?v=aWvrN5EsqA4) and was much better than the "twice around the Coliseum track" in the 1950s discussed earlier in this Chapter! Dr. King had arranged a flight from Hong Kong to Haiku City, Capital of Hainan, for Bonnie, daughter Robin and me. Little did we know that ALL the passengers were flying to Haiku for my arrival ceremony!

Upon landing, I looked out the plane window. "Robin, there are at least 20 girls with flowers forming a gantlet for me!" Robin: "It's not a gantlet Dad it's a welcoming party for you." "OK, but let's get going! Bonnie, stop looking for your lost earring!"

(Of course, she didn't!) We left the plane and were met by the Governor and an entourage of dignitaries. They had arranged for three limousines, one for each of us. I indicated we would all fit in one of them. Off we went. I turned to Robin, who had been filming the event "Look Robin and Bonnie, the Mayor of Haiku City has just joined our procession with two more police-car escorts!" Robin turned to me: "Listen Dad, you are being really hubris – If you don't quiet down, I am going to stop filming!" OK, I was out of bounds, but this was the best Parade I had ever been in (even a platoon of the Chinese military for added protection) -- far superior to Darilyn Zanuck's drive into *Twenty Century Fox* and "twice around the Coliseum track"! There were speeches – Bonnie (The "First Lady") gave one. They played our National Anthem when I arrived at the City Hall – Banners in Chinese announcing, "*President Robert M L Baker, Jr. has arrived*." Interesting that I was called in Chinese, "Baker Boss." (Bonnie – I hope you are reading this!) The purpose of the meeting was for the Governor and me to sign an Educational Agreement (big ceremony – lots of pens) that would add hundreds of enrolments to WCU. What an experience! We had a nationally (all China) televised Press Conference! At one point a reporter asked about our view on pollution. Robin (having been the Night Reporter for TV station KMIR in Palm Springs, California) started to answer when Dr. King politely whispered to her ("Robin this is not your Press Conference – it is for your dad!"). At one point in a private meeting, I had with the Governor an aide told him that a US Senator wanted to talk to him. "Tell that Politician not to bother me – I am talking to President Baker!" (That fed my hubris!)

"I am Art Buchwald!"

Besides trips abroad to encourage overseas enrollments we often visited Washington D C, specifically so I could attend the meetings of the *National Advisory Committee on Accreditation and Institutional Eligibility.* One time we were lunching at *Rive Gauche* a very "in" restaurant for Regan's "kitchen cabinet" and really important politicians. Over to our table came the famous satirist, Art Buchwald, *Pulitzer Prize* winning (1982 and 1986) author for his commentary in the *Washington Post*. We had met him previously at the *Washington Square Bar and Grill* in San Francisco. Allow me to pause here. That meeting was most interesting: Bonnie was talking to a nice gentleman at the Bar. I leaned over to her and said, "That fellow sounds like Art Buchwald." Bonnie turned to him and said "My husband thinks you sound like Art Buchwald. "He said "I am Art Buchwald!" He has a very distinctive voice. He told us he was in San Francisco because he was suing the Producers of the Movie "*Coming out of Africa*" since he had written the story earlier – and he won! Back to the *Rive Gauche.* Art said he was sitting with the Kennedy clan but would rather be with us! Clearly, he also had excellent taste!

During my travels in search of new students for WCU I found myself seated by two famous movie stars. I was scheduled for an important Conference but found the only available aircraft was sold out! Then an airline executive approached me: "One of our passengers heard of your plight and offered you the seat next to him. He is so famous that he usually reserves two seats for himself, one next to him to remain empty." Once seated I discovered my seat partner was Rock Hudson, famous for his roles including many Doris Day movies. On another occasion I found my seat partner to be Danny Thomas (singer, actor, producer and great supported of St. Jude Children's Research Hospital). He introduced himself and suggested that "You probably would have rather sat next my good-looking daughter Marlo (of "That Girl" TV-show fame at the time)." Anyway, just after the plane reached cruising altitude and the seat belt signs were extinguished, Danny arose from his seat a proceeded to entertain us with his SHOW!! We were on our way to New York and his impromptu performance lasted almost two hours! When he was again seated, I turned to him and said: "Mr. Thomas that was the most amazing show I have ever seen in my entire life! Why did you decide to do it? "Oh Dr. Baker, that was nothing -- I simply love to entertain!"

In 1992 we experienced the "Rodney King" riots. The whole area surrounding WCU's main location on Shatto Place was close to those riots. We were not directly affected, but a month or so after the riots, my Security and Facilities Chief, Bob Montgomery and I were making our monthly facility tour. I looked up at the roof of our main building and said, "Bob if the rioters attacked our university here that would make a good place for a machine-gun nest." The next week Bob Montgomery came to my Office: "Dr. Baker, I have the sandbags ready and a line on obtaining a Browning Automatic Rifle (BAR), do you happen to know where I can obtain ammo for it?" I said, "Oh my goodness, I was only speculating – just forget the machine gun nest for now!" By the way, in 1992 Bob told me: "You have not touched your old files for ten years – we are out of space – can I toss them?" I told him that he could, but that it broke my heart to throw anything away so "When you do the deed, don't tell me!"

At WCU I worked with my Provost Burt Bussel (a retired UCLA Professor) on an educational concept we called *Remote Interactive Individual Student Education* (RIISE) for our graduate master's degree working-adult programs. In one embodiment each remote student's computer screen was divided into 25 little pictures: 24 of each student and one with the instructor. There were two categories of Instructors: Performing and Technical – Performing to present the course and Technical to develop the Lesson Plan and all the visuals. There would also be Director to produce the lectures. I even practiced the concept to a small degree while

lecturing at the US Air Force Academy. Also, Burt and I developed an *Electronic Tickets and Bag Tag* research study at WCU. The idea was to have your bags picked up at your residence or dropped off curbside at the Airport "… never to be seen again until entering your hotel room!" You make your air reservations on your cell phone. Seamlessly you are guided (e.g., GPS) to your airport, stride in and have your documents (tickets, passports, etc.) scanned remotely and TV scanned face ID made and then simply board your plane and take your seat – no human intervention required! This idea would not work today due to security measures.

Does time have a "speed" – your wristwatch running fast or slow (in the latter case you miss appointments!)?

I also took the opportunity to teach space science as part of WCU's Engineering Master's Degree curriculum also in about 1992. My syllabus included an updated, from my 1970 lectures at UCLA, *Astrodynamics*, textbook of mine as well as a handout describing our early Universe. They were triangular shaped shelf paper. At the apex of each sheet was the beginning of our Universe and as they were ***rolled out*** by my students, drawings of proto-galaxies, formation of stars, etc., appeared. Basically, it depicted my theory for the "Rollout" of our Universe both in time, starting out with an almost infinitely fast "speed of time" (clocks running very fast – hands just whirling around, please see the Prologue in Appendix II) and slowing, and in space starting out with vanishingly small dimensions and growing. Where did I get this idea? Well, a very important aspect of my courses was the questions posed to me by my students and most especially by my wife, Bonnie. (Sometimes I thought I learned more from them than they learned from me!) My Rollout of our Universe and high speed of time idea came to me one day when Bonnie pointed out that a Big Bang theory, as proposed by a scientist she had just read about Alan H. Guth at Cornell, would seem to move material at about 10^{23} times the speed of light (1 with 23 zeros after it) to reach the size of a marble when our Universe began. "That can't be" Bonnie said! Bonnie then asks me**:** "*If objects move with varying speed in the three space dimensions, then why can't time move with varying speeds in the time dimension*?" She does not have a degree in astrophysics – in fact, no graduate or post- graduate or even a bachelor's degree– no formal education in Physics or Astronomy BUT I say: Certainly, "Out of the mouth of a beautiful *babe* comes wisdom …" Bonnie's wisdom possibly upending *the standard cosmological model*!

Maybe, following Bonnie's question, I thought, time might have been moving fast back then as compared with slower time now, and it just appears, after a little calculation, that spacetime was moving out initially at the speed of light!

The idea is that our Universe started off with time moving extremely fast. Time itself being near "zero" or Planck Time, but dimensions really small, small "as can be" for example a Planck Length. "Wait a minute" you might ask – "what is this Planck Length and Time?" Max Planck was a theoretical physicist whose discovery of energy quanta won him the Nobel Prize in Physics in 1918. As will be discussed in Chapter 12, like Professor Herrick, Planck was in search of a "Universal" set of fundamental constants. The Planck Length is the scale at which classical ideas about gravity and space-time cease to be valid, and quantum effects as described by Max Planck, dominate. This is the quantum of length, the smallest measurement of length with any meaning. And roughly equal to 1.6×10^{-35} meter or about 10^{-20} times the size of a proton! (Really small, 1.6/100,000,000,000,000,000,000,000,000,000,000,000 meter.) Planck Time is time it takes a photon to move across a Planck Length or 5.39×10^{-44} seconds, that is 5.39 divided by 1 with 44 zeros after it! It is the smallest unit of time you can conceive! The speed of light would be unchanged (say about 3×10^{8} or more exactly = 299,792,458, meters per second or 186,282.397 miles per second) - "small" mile offset by "small" second!) and would be preserved as a constant and *all the laws of physics are preserved* – a person living then would see all physical processes unchanged – would not even realize that time is going fast, or dimensions (yardsticks) are small! As the Universe progresses time slows and dimensions increase – both, say, to today's values. BUT the speed of light remains completely unchanged as shown in the following cartoon, from my Lecture concerning the speed of light or the "speedy photon"!

The speedy photon's speed, c = 186,282.397 miles per second *and* is the same in all frames of reference according to Einstein's special theory of relativity

mile

mile

Smaller second offset by smaller "standard" mile! After time "zero" or Planck time, the speed of time slows and the space dimension grows from the infinitesimal Planck length to today's. Both changes (slow/grow) in the same proportion to insure the constancy of the photon's speed of light!

Do we "see" the beginning of Our Universe? In a way we do! There was detected, by accident, the Cosmic Microwave Background or CMB.

The Cosmic Microwave Background (CMB) is essentially Black-Body radiation from what has been called a "snapshot" of the beginning of our Universe.

We view it not as a snapshot, but a very compressed time segment of our Universe. It is like the frames of a movie all piled up together one frame on top of the other!

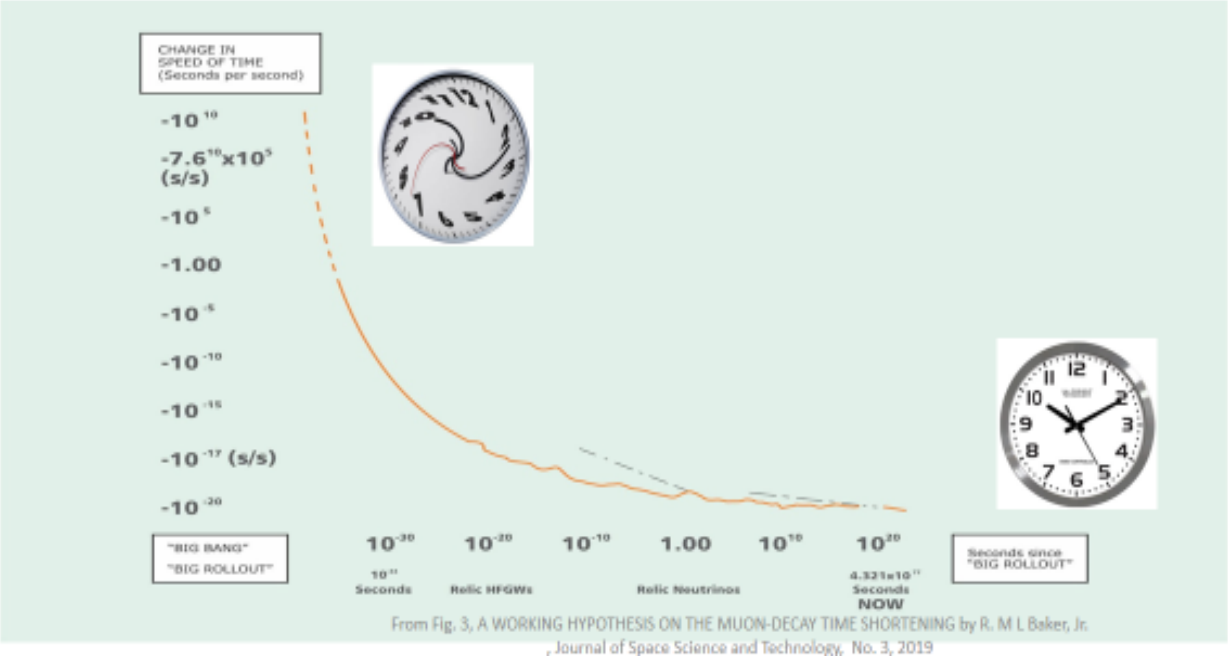
What do see when all the frames of a movie are displayed at one time? You get BLACK -- literally a "Black Body" You see a faint cosmic background radiation filling all space – literally billions of years piled upon billions of years of faint faraway stars!

The Beginning

Planck Time = $\sqrt{(\hbar G/c^5)} \sim 5.39 \times 10^{-44}$ sec and time since then ~ 4.4×10^{17} sec so now our Universe has completed about 61 orders of magnitude (in 10s) changes in time since the The Beginning! With Terahertz HFRelicGWs on into "infra-Red" GWs we may be able to detect processes to femtosecond (10^{-15} sec) precision. We could then detect a fictitious star "frame" change below between a star "field" progression over a billion years that today Appeared to take place during only a microsecond!

Although so far not statistically significant, my studies of Muon decay time (please see the two Tables coming up in Chapter 12) suggest that at the current time (NOW at 4.3×10^{17} seconds after Guth's "Big Bang" on the right of the next diagram), time is still slowing at the rate of about 13 picoseconds per year. A picosecond is a trillionth of a second, or 0.000,000,000,001 seconds. —really, really small unit of time! On the graph (left ordinate) it would amount to minus 13ps/31,540,000,000,000,000,000ps per year equals -3.7×10^{-18} picoseconds per picosecond or seconds per second slowdown in time now, at our Earth! Awfully small BUT no matter what size it is we would not notice it in our daily lives or in physics laboratories. For example, the measurements of the acceleration of gravity and the speed of light would essentially remain unchanged!

Notional graph of the change-of-speed-of-time variation with ***today's time dimension***. Notice different slopes (tangents) and irregularities



From Fig. 3, A WORKING HYPOTHESIS ON THE MUON-DECAY TIME SHORTENING by R. M L Baker, Jr. , Journal of Space Science and Technology, No. 3, 2019

Now as we head to "the end of time" (off to the right in the above picture) length (dimensions) keep growing, but the clocks keep slowing and our Universe finally grinds to nearly a halt! It's like an old clock that keeps slowing as time goes on. (An interesting comment by Ray Comfort was that "Three different places in the Bible (Isaiah 51:6; Psalm 102:25, 26 and Hebrews 1:11) indicate that the earth is wearing out … everything is running down …"). Note also that the infinitesimal Planck Time interval is analogous to the extremely brief starting pistol's sound (report) time interval that signals the beginning of a race and, analogously, the beginning of time. OK? There is another possible feature of the foregoing graph, the curve need not be an esthetically smooth one, like an exponential form for example. It can have different slopes and could be quite uneven since there is no *a priori* evidence to the contrary. It could be possible to have time slow down faster, speed up, be constant and time speed does not change for a while (a pause) **– also an increase in the speed of time and an associated decrease in the space dimension of spacetime could occur for a while**! (Please see the foregoing drawing of the "Speedy Photon".)

In essence this is my new theory for the beginning of our Universe-- the concept of the *Rollout of our Universe* from **in the beginning**. Ah Ha! Now you finally found the title of this story, in Hebrew its *Beresheet!*

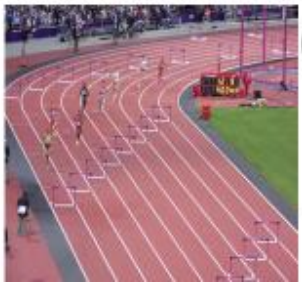
Presentation to the "Rounders" of the Economic Round Table on BERESHEET. Control-Click on the PowerPoint file below. Just click on the slide image to advance the slide show. (Slide 26 is fun!)
http://www.drrobertbartbker.com/berersheet.html

Gedankenexperiment

Back to my idea of our early Universe. I like "thought experiments," sometimes called a "Gedankenexperiment" by smart German Physicists! Here is my thought experiment:

We look back in time several billion years – in actuality we do this when telescopes look at stars billions of light-years away! We see a galaxy. It appears to be rotating faster than expected. Next we look at an Olympics Games Coliseum on a duplicate Earth (we are pretending here – a thought experiment).

There we see a little track with little runners going around – wow! They make 4 circuits (mile) in a few seconds by my wristwatch! Fast like the galaxy! Now I look at the weight-lifting pavilion. There are little weight lifters also moving quickly and pushing up little bar bells. A fast-moving miniature *World*.


I now turn my attention to an imaginary miniature Physics Laboratory – Physics 1A I think. Little students are swarming rapidly around the laboratory's miniature equipment. The little Instructor looks pleased – two of his students have just again proven that the acceleration of gravity is about 9.8 meters per second per second and the speed of light 186,282.397 miles per second!

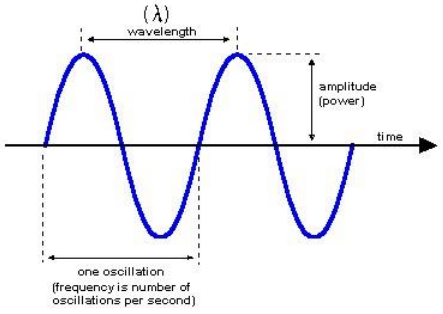
Next we look back in time only a few billion years. About the same thing, but the galaxies are rotating not quite as fast, the Olympic Games Coliseum is larger as is the Physics 1A lab and all the people are a bit bigger and moving a bit slower – but the Lab Instructor is again smiling since the acceleration of gravity is apparently still measured by his students to be 9.8 meters per second per second and the speed of light remains unchanged.

As the Universe progresses time slows and dimensions increase – both, say, to today's values. Now as we head to "the end of time" length keeps growing, but the clocks keep slowing, both perhaps erratically, and our Universe finally grinds to a halt-- the clock stops!

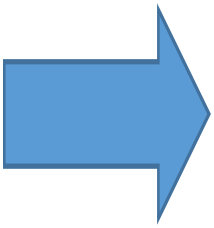
Artificial Knowledge

Another publication in June, 2019 may have had far more importance than the Black-Hole picture in April, 2019, which excited many scientists and non-scientists. ("**Memory formation in the absence of experience**," Vetere, G., et al., *Nature Neuroscience*, 2019, June 22, (6):933-940. DOI: 10.1038/s41593-019-0389-0). Toward the end of Chapter 6, in the footnote * I discussed an "intermediate memory". But what if an Artificial Memory could be implanted in your Brain? Just imagine an Artificial Education – your brain filled with Artificial Knowledge!

Artificial Education



(artificial memory transfer)



However, "Naked Knowledge" may not be as important as we might first think. Wife, Bonnie has what is called an "eye for style" in clothes, household furnishings, etc. Suppose her brain was filled with information about clothing, furnishings, latest fashions, fabrics, etc. This might assist her natural "eye", but without her mental analysis and visual skills, would not replace it. *Naked knowledge* of paints, canvases, art history, etc. would not an artist make! Artificial simulation of abstract thinking, creation of "new" ideas, would probably be extremely difficult to implant in memories as well as muscle-control protocols for physical action, e.g., sports and emotions like love and hate or dislike. Perhaps these mental functions are involved in other parts of the brain and not analyzed like the *basolateral amygdala* portion observed in the referenced study. Although implanted in memory hypnotically, the conditioned response of the soldiers in the movie *Manchurian Candidate* (1962) was "Raymond Shaw is the kindest, bravest, warmest, most wonderful human being I've ever known in my life" according to the story they all still did not like him! So, let's not replace a *good* university education (like WCU) by an implanted memory just yet! Please see the video: https://www.youtube.com/watch?v=3UcJfvfoQIQ.

Dimensions

I do not like the word "dimensions" of which time is the 4th "dimension." I propose the word "element" (definition: a part or aspect of something, especially one that is an essential or a characteristic part). I believe that there are only two **elements** required to describe location in our Universe: Time and Space! Space usually has 3 "dimensions" (or more in *string theory* – we see a "Particle" as a dot at the end of, say, a multi-dimensional string, so maybe 7 or more dimensions of kinks and terns in the string! In most people's minds dimensions are associated with "size" and "time" and string theory has little to do with it!). In Chapter 12 I even propose a "Fifth Dimension" or element in this case an element to describe what *particular* universe we are we in. Problem is "dimension" is too ingrained in our vocabulary to change. In the 1970s Dr. Lewis Larmore (Chief Scientist of Lockheed and of the

Office of Naval Research, Solar Astronomer and a great friend and mentor) attempted to change all measurements in the US to the metric system. A laudable idea, but it got nowhere!

Now signage on the 10 Freeway

Things at WCU were prospering, Dr Larmore and later Fred Nason, Jr. headed the Board of Trustees. We were receiving donations from Harold "Skip" Bowling (President of *Lockheed Martin Aeronautics*), Dr. Ken Morgan (UCLA Phi Psi fraternity Brother) and others, then the Cold War ended, and **our Business Plan went out the window!** Companies had lost government aerospace and defense contracts. They now had a surplus of highly trained personnel. Our enrollments dropped like a rock! Of course, our finances followed them down. I tried to "reinvent" WCU as a more "conventional" university. I reached out to the minority community by giving speeches at the *First AME Church.* Standing at the Podium with the choir singing gloriously behind me and the congregation standing and chanting in front of me I felt like I was on center stage of a Broadway Musical! But to no avail. The accreditors did not take pity on our miserable finances, we lost accreditation and "there went the Ball Game!" *American Career College* purchased WCU -- today (2021) you can see our buildings with prominently displayed WEST COAST UNIVERSITY signage from the 10 freeway.

In fine, I want to remind you that whether it is an organization like WCU or a Theory of our Universe, we must rely on the information and observations gained by experiment – and especially rely on the accuracies in projections based on that information, to make informed decisions. But remember always that science is **NOT** absolute truth, but always subject to refinement and even complete change!

CHAPTER 10

What do I do now?

It was the turn of the Century, the year 2000. Especially at 70 years of age the pickings for my employment were not lush! No more visits to the Moon planned. No Cold War. Lots of orbital mechanics (astrodynamics) around – many of whom I taught! Now I recalled what Bonnie suggested in the 1960s: "*Why don't you work on gravitational waves? I have a feeling they may be important in the future!*" Her comment was in connection with the first Lecture (November of 1961) of a lecture series I had started at LARC –*Lockheed Astrodynamics Research Center*. The Lecture was based upon a phone call I received from Dr. Robert Forward of *Hughes Research Laboratory* in Malibu, California, He called me in connection with his PhD work with Professor Joseph Weber (inventor of the "Weber bar", gravitational-wave detector) and my research on gravity gradients with W. B. Klemperer ("Satellite Libations," *Astronautica Acta* 3, pp.16-27, 1957). During our joint Lecture Forward coined the term "High-Frequency Gravitational Waves" or HFGWs and I suggested their use for global communications here on Earth, to monitor extraterrestrial intelligence communications and study the beginning of our Universe. "Since HFGWs passed through all matter without attenuation they would provide the very best means for all these applications!" I lectured. Bonnie had read Lockheed Research Report RL 15210, based upon notes taken of that joint Lecture, by Samuel Herrick (as I have stated, a Lockheed Consultant, UCLA Professor and my mentor). Since LARC was near UCLA in Bel Air (650 North Sepulveda) attendees included several UCLA faculty members such as Geza Gedeon, Robert Rector, Burt Bussel, Andrew Charwat and Kurt Forester. This Lecture was the first time any of us had heard concerning gravitational waves, especially HFGWs.

In 2000 there was no work on the Weber Bar only some preliminary work on the Laser Interferometer Gravitational-wave Observatory or LIGO at Caltech and MIT by Kip Thorne and others (remember him from Chapter 3); but it was for the detection of very low-frequency gravitational waves (fractions of a cycle per second) generated by coalescing Black Holes. My preference was for High-Frequency Gravitational Waves (HFGWs) as defined by Robert Forward, which might have practical value such as direct picosecond communication directly through the Earth since, as I mentioned in that 1961 Lecture at LARC and another lecture to more UCLA faculty, "like gravity itself HFGWs pass through all matter without

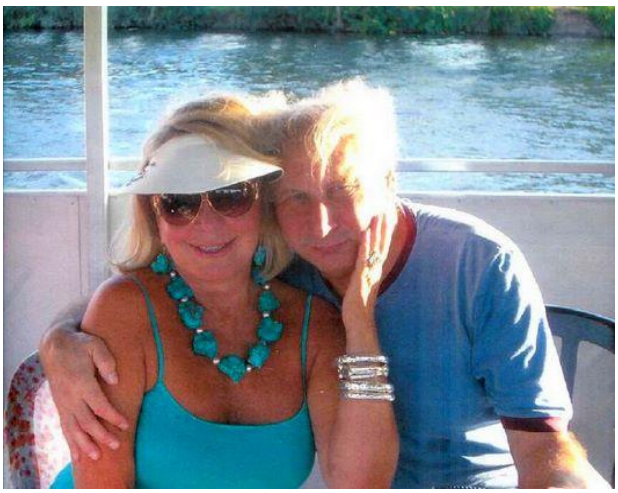
attenuation" so it was time for me to get busy with high-frequency gravitational waves (HFGWs)! Such HFGWs might also be generated by our early Universe and be, of cosmological interest, especially to validate my Rollout Theory of our Universe!

Right off the bat, a couple of weeks after New Year's, 2000, I contacted the *US National Security Agency* (NSA) since I believe HFGW communication might have National Security implications (in reply I received a written communication from the *United States National Security Agency* (NSA) by G. Hendge, to Robert M L Baker, Jr., dated on January 19, 2000). It provided some additional gravitational wave equations but showed no real NSA interest. Nothing more from NSA, however.

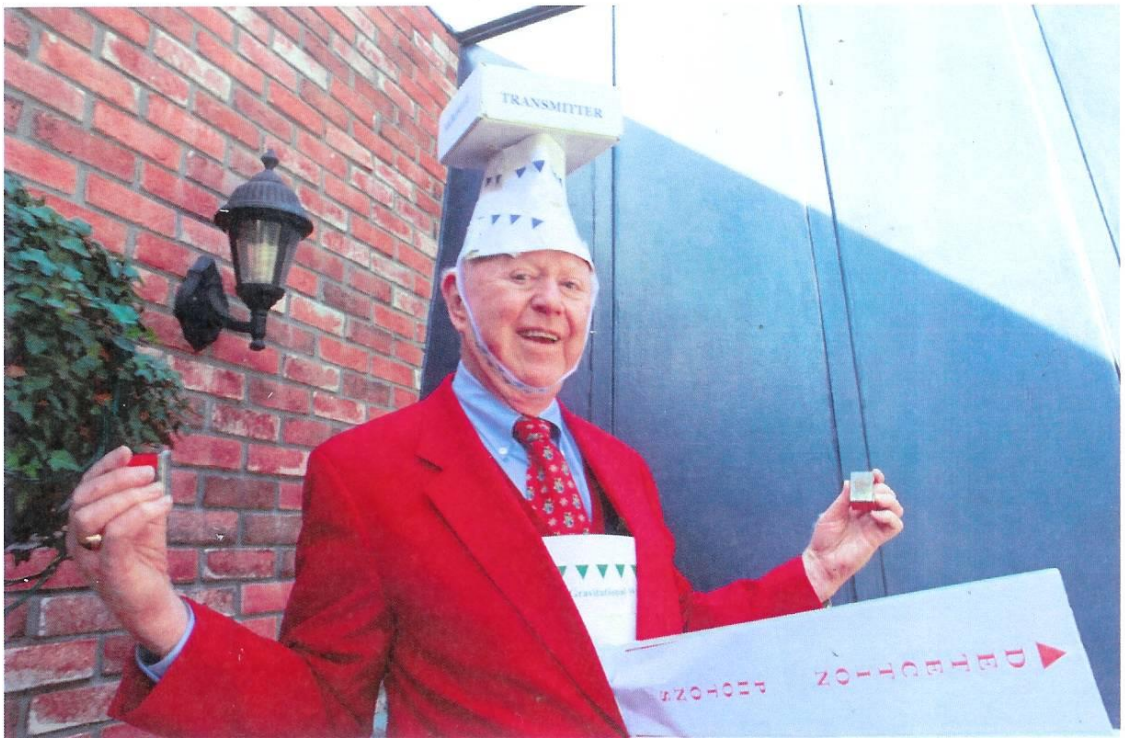
Next, with the great help of Bob Fell, who produced all the documentation artwork at his corporation, I presented a paper entitled "Preliminary Tests of Fundamental Concepts Associated with Gravitational-Wave Spacecraft Propulsion," at the *American Institute of Aeronautics and Astronautics: Space 2000 Conference and Exposition* (Paper Number 2000-5250, September 20, 2000; by the way, the Day my grandson, Alexander Fell was born!). Subsequently however, I concluded that HFGW propulsion had little practical value.

In the Soviet Union, especially in the Ukraine, top scientists such as Aleksey Zinovievich Petrov, had accomplished considerable HFGW research, also at *Moscow State University*, especially concerning the "Gravitational wave Hertz" experiment studied by Valentin Rudenko, the concept of the laboratory generation and detection of HFGWs. In Germany, Heinz Dehnen was analyzing a crystal-oscillator laboratory HFGW generator or transmitter. In Italy, Giorgio Fontana was analyzing a "HTSC Gazer," initially suggested by Halpern and Laurent, to generate HFGWs in the laboratory. Massimo Giovannini and others were continuing their research into the early universe generation of HFGWs. Fangyu Li had completed studies in the 1990s with Valentin Rudenko at the *Sternberg Institute of Moscow State University*. Specifically in China, Dr. Fangyu Li had accomplished research

into the Li-Effect at *Chongqing Univaersity* in which a Gaussian electromagnetic field and an intense magnetic field might allow for the detection of HFGWs. (Fangyu Li and Meng-Xi Tang (1997), "Positive Definite Problem of Energy Density and Radiative Energy Flux for Pulse Cylindrical Gravitational wave," *ACTA Physica Sinca* **6**, Number 5, 321-333, etc.). After studying Fangyu Li's research on the interaction of EM and GW waves I figured out a way for using it to detect HFGWs and patented the Li-Baker HFGW generator and detector in China (Peoples Republic of China Patent Number 01814223.0, "Gravitational Wave Generator (Detector)," filed July 13, 2001, granted September 19, 2007). The patent filing in China was an ordeal since my Patent Attorneys (Christie, Parker and Hale) utilized a Chinese associate to process the Patent. Problem was I could not read Chinese! I was never sure of the translation of my Patent Application's development – actually therefore, I never really read my Patent Claims! At the 2003 MITRE Corporation, first HFGW Conference (to be discussed), I discussed my Patent Application (English one prior to translation) with Leonid Grishchuk, a good friend of mine. He said "Bob, the high-frequency–gravitational-wave part of your Patent Application is novel and workable, but needs testing!" About this time I learned that Dr. Amar Bose of MIT had developed a Bose Aviation Headset -- essentially noise-canceling earphones. So I thought, that the same principle could be utilized in my HFGW detector. If stray noise spillover and diffraction still manages to get reflected onto the two detectors then they will create noise, but such noise could be filtered out by pulse-modulating the magnetic field. The idea is: that when the pulse-modulated magnetic field is "off" only the stray spillover noise and not the HFGW signal is present. Therefore, it can be effectively subtracted from the noisy signal, leaving only the HFGW signal and the sensitivity of the Li-Baker detector is thereby greatly improved.



Bonnie Baker and Leonid Grishchuk "discussing" the Li-Baker Patent Application!



Schematic of the Li-Baker High-Frequency Gravitational Wave Detector

(Magnets in each hand –Magnetic field in between, Gaussian Electromagnetic field generated down from a transmitter on my head and HFGW detection photons coming out from my stomach) Presentation to Economic Round Table.

In 2002 we traveled to Europe to present my HFGW ideas to John C. Miller (a famous Oxford astrophysicist, who worked with Steven Hawking) at the *International School for Advanced Studies* in Trieste, Italy (Bonnie said she compared a Black Hole to the *Roach Motel* "where you can check in but can't check out" – he loved it!) He also mentioned the possibility of mini-Black Holes in the early Universe. I mentioned my theory that the Universe started out with time moving very fast (another idea from Bonnie) and space dimensions very small so that Black Holes would appear small. We also met with Mike Cruise, Dean of Science at *Birmingham University*, England (viewed his and Richard Ingley's HFGW Detector); Professor Giorgio Fontana of the *University of Trento*, Italy (we met at the Villa Feltrinelli on Lake Garda); Harald Dimmelmeier, the *Max Planck Institute* in Munich, Germany; and several scientists at *INFN Genoa*, Italy to view their double-sphere HFGW detector. I learned a lot!

Next, I got together with a friend of mine, Paul Murad, who had some connection with the US "Intelligence Community." After considerable hard work he arranged the "First Gravitational-Wave Conference, High-Frequency Gravitational Wave Working Group" at The *MITRE Corporation* in Mclean, Virginia, May 6-9, 2003.

Things were picking up!

I presented several technical papers on HFGWs. For example, Paper Presentation on High-Frequency Gravitational Wave Surveillance at the Space Technology Applications Forum (STAIF 2007) Albuquerque, New Mexico, USA, February 14, 2007. And the *2nd HFGW International Workshop Institute for Advanced Studies at Austin* (IASA), Texas, September 17-20, 2007, organized by Hal Putoff and Eric Davis. A few of the attendees shown below.

Left to Right: Leonid Grishchuk, Valentine Rudenko, Hal Puthoff, Giorgio Fontana, Gary Stephenson, Bob Baker and Eric Davis (attendees not shown: Fangyu Li, Bonnie Baker and Clive Woods)

We traveled extensively in China, where I worked with Fangyu Li who was accomplishing HFGW research at *Chongqing University* in China, especially on the Li-Baker HFGW Detector.

Fangyu Li and Dr. Baker 2007

In 2008 there was a "hiccup" concerning a JASON Report (PLEASE VISIT: http://www.drrobertbaker.com/docs/Q%20&%20A%20JASON.pdf http://www.gravwave.com/docs/Q%20&%20A.pdf AND a very detailed theoretical response by Fangyu Li: http://www.gravwave.com/docs/Li%20response%20to%20JASON.pdf) that seemed to stall HFGW research for a while. But there was continuing HFGW research in China. Pictured next are HFGW researchers and faculty at *Chongqing University* in 2009. The "hiccup" did in fact stall HFGW research until at least sixteen years later when Dr. Eric Davis clarified the unfortunate situation in an email to Liliana Velasco-Sevilla of a UHF-GW group. The matter consumed many years of my time so I will quote the correspondence below in full:

HFGW researchers and faculty at Chongqing University in 2009.

##

From: Seculine <seculine@gmail.com>
Sent: Monday, July 25, 2022, 10:26 AM
To: Robert Baker Jr. <drrobertbakerjr@gmail.com>; Bonnie Baker <bonniesuebaker@gmail.com>
Subject: Fwd.: New direction of the WG: Resonant Electromagnetic Detectors

Quite a revelation form Eric:

Sent from my iPad

Begin forwarded message:

From: Eric W Davis <eric.w.davis@aero.org>
Date: July 25, 2022 at 12:59:01 EDT
To: Liliana Velasco-Sevilla <liliana.velascosevilla@gmail.com>, Seculine <seculine@gmail.com>, Fang-Yu Li <cqufangyuli@hotmail.com>, Garv

Stephenson <gary.stephenson@wisk.aero>, Gary Stephenson <gary.stephenson@gmail.com>, Alexander Bonilla <alex.acidjazz@gmail.com>, Clive Woods <cwoods@lsu.edu>, Andrew Beckwith <rwill9955b@gmail.com>
Subject: New direction of the WG: Resonant Electromagnetic Detectors

Hi, Liliana!

Please inform the UHF-GW leadership that they are uninformed of the reality that occurred in the background of the Jason Report in question. Therefore, their scientific misgivings or concerns are completely unfounded and based on wrong information contained within that report. The *Jason Report was commissioned by* **Ronald S. Pandolfi** *of the U.S. Central Intelligence Agency (CIA) for the sole purpose of damaging the reputation of Dr. Robert Baker and his associates.* Mr. **Pandolfi** has a history of attacking certain people in the U.S. government scientific establishment (scientists who work at the national laboratories or at the military service science laboratories) that he has personal issues with by filing false security violation, or other, allegations against them in order to get them fired from their government job or to tarnish their professional reputation if they are U.S. civilian scientists. Unfortunately, the CIA only punishes him but never terminates his employment.

Mr. **Pandolfi** was investigated by the Federal Bureau of Investigation and the CIA's Executive Director, security office, and personnel office for his allegations against Dr. Robert Baker and associates. His allegations were that they were in an illegal business collaboration with the Chinese government by collaborating with Prof. Fangyu Li and his associates at Chongqing University in China while also taking US government funding at the same time. Mr. **Gandolfi**'s intelligence analyst position at the CIA had the China portfolio during the mid-2000s. The investigation concluded that Mr. **Pandolfi** abused the Jason contract with the CIA by going outside of his chain of command to avoid receiving supervisory peer review and approval of his Jason study on HFGWs, and for the POOR scientific justification (Li and Baker, and their associates were engaged in pseudoscience) that he gave as an excuse to issue his contract to the Jason Committee. Mr. **Pandolfi** was found at fault for violating a number of internal CIA procedures and protocols, his pseudoscience and financial corruption charges were disproven, and

he was then stripped of his official duties and administratively suspended from work for some number of months while a security investigation was underway.

This was a horrible mess that began when Mr. Paul Murad (deceased earlier this year), another intelligence analyst who worked at the Defense Intelligence Agency (DIA) (and supported the HFGW work of Dr. Baker and his associates, and Prof. Li and his associates at Chongqing Univ.), had approached Mr. **Pandolfi** at the CIA to seek **Pandolfi's** advice on where to find federal R&D grant opportunities that might help to fund the Li-Baker HFGW detector collaboration. Some months after Mr. Murad contacted Mr. **Pandolfi**, Mr. **Pandolf**i filed false allegations of corrupt collaborations with the Chinese government against Mr. Murad which ended up costing him his job at the DIA when he was forced to retire as a condition of a US federal court dropping all charges against him during trial. Mr. Murad was discovered to have a blemish on his record for his past improper interactions with the Australian government in the 1990s while **Pandolfi's** allegations of Mr. Murad's collaborations with the Chinese government were disproven in court.

Contrary to the false information contained within the Jason report, the Li-Baker HFGW detector is NOT based on the Gitenstein effect or the inverse-Gertsenshtein effect. Instead, it is based on the electromagnetic (EM) perturbative effects produced by high-frequency gravitational waves in the GHz band in a special EM resonance system (https://link.springer.com/article/10.1140/epjc/s10052-008-0656-9). This new HFGW-perturbative photon resonance mechanism originated from Prof. Li's Ph.D. dissertation under the supervision of Prof. Valentin N. Rudenko (whom I personally knew and is long ago deceased) at the Sternberg Astronomical Institute, Moscow State University in the 1990s. Prof. Leonid P. Grishchuk (I also personally knew, and he too is deceased) was also at Sternberg with a dual appointment at the School of Physics and Astronomy at Cardiff Univ. in the UK, and he supported Prof. Li's and Prof. Rudenko's HFGW work. The Jason report DID NOT EVER evaluate Prof. Li's original HFGW detector physics or the updated Li-Baker version or Prof. Li's extensive record of peer-reviewed published technical papers on this topic.

Dr. Baker's American associates Gary Stephenson, me, and Prof. Clive Woods coauthored peer-reviewed technical journal papers with Prof. Li and Dr. Baker, which went unmentioned by the author of the Jason report. Instead, the author of the Jason report, "D. Eardley" (whom I could never identify in American academia except that he may have been at the UC-Santa Barbara), spent much of his report on critically analyzing a selection of Dr. Baker's HFGW detector technology application inventions that he submitted as U.S. patent applications. This critical analysis is fair game because all technology patent applications should stand up to technical scrutiny. I can support the argument that Dr. Baker's HFGW detector technology applications could be in error based on the physics, but the actual Li-Baker HFGW detector is not in error until it is tested in the lab and shown to not work. However, Eardley did not even spend any time doing a critical technical/physics analysis of Dr. Li's original HFGW detector physics or of the Li-Baker detector, which Eardley completely misrepresented as a Gertsenshtein effect detector.

Dr. Andrew Beckwith was in the background when all this damaging nonsense with **Ronald Pandolfi** occurred during 2008-09. So, Andrew can confirm the facts of what I wrote here.

You are free to forward this reply message to the leadership of the UHF-GW initiative as my rebuttal to their concerns. I will be happy to answer their questions about the Jason study.

I apologize for being silent and unable to participate in our Li-Baker study group, but I plan to rejoin in September after I clear off some time-consuming projects and work matters that have been on my plate since March. Two of my Ph.D. students (both married with very young children) at Baylor University died from COVID just before they submitted their dissertations for their oral defense last March and April. So my physics department colleague and I had to pick up the pieces in the aftermath of our students' passing which has taken us a few months of navigating the campus bureaucracy on behalf of their families. At the same time, I have been working every evening and on weekends to complete the draft of an invited book chapter that was due last March. Repeated business travel for my full-time job at The Aerospace Corporation has also prevented me from having any

free time for other things. I expect all this to clear up on my calendar after the end of August.

Regards,

Eric

Eric W. Davis, Ph.D., FBIS, AFAIAA

Corresp. Member, Int'l Academy of Astronautics

Senior Project Engineer, Space Nuclear Propulsion

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From: Liliana Velasco-Sevilla <liliana.velascosevilla@gmail.com>
Sent: Monday, July 25, 2022 9:35:13 AM
To: Seculine <seculine@gmail.com>; Liliana Velasco-Sevilla <liliana.velascosevilla@gmail.com>; Fang-Yu Li <cqufangyuli@hotmail.com>; Garv Stephenson <gary.stephenson@wisk.aero>; Gary Stephenson <gary.stephenson@gmail.com>; Alexander Bonilla <alex.acidjazz@gmail.com>; Clive Woods <cwoods@lsu.edu>; Eric W Davis <eric.w.davis@aero.org>; ewdavis@earthtech.org <ewdavis@earthtech.org>; 李芳煜 <fangyuli@cqu.edu.cn>; Andrew Beckwith <rwill9955b@gmail.com>; 李瑾

<cqujinli1983@cqu.edu.cn>
Subject: New direction of the WG: Resonant Electromagnetic Detectors

Dear WG,

I hope this message finds you well. As you know, this Working Group was formed to examine aspects of HFGW detectors using first-order interactions between EM waves and GW waves, as an adjunct to the UHF-GW initiative that is examining diverse aspects of GW.

I have to share with you that I was informed by the UHF-GW initiative that some of its leaders are unhappy with the conclusions of the Jason Report as they apply to this WG and, as they are regarding that report as beyond dispute, they are expressing serious misgivings about the validity of anything we do. I am seriously concerned about this view as the Jason Report itself is a valid topic of study and of academic/scientific criticism, but that point appears not to be accepted by the UHF-GW initiative. That is surely not an acceptable way to continue, so I am proposing that we should continue to work on understanding the ideas of the detector. However, our contributions may not ultimately be acceptable to the UHF-GW initiative, but it should be publishable elsewhere.

The content of this message has been discussed beforehand with C. Woods, to whom I reached out before proposing the WG within the UHF-GW initiative.

I would like to create a professional scientific environment for this pursuit. I understand that this development may create frustrations and disappointments, but I would like to ask you to send non-scientific comments privately to me and to Dr Woods, not to the list.

At this stage I see two basic areas of work:

1. The basics of a detector exploiting linear conversion from incident GW to detectable EM waves, and

2. Full understanding of the "Li-Baker" detector as proposed so far.

I hope that you would like to continue contributing to this WG, so please send me a message indicating your intention within one week. I can then assign new goals and tasks.

Yours sincerely,

Liliana Velasco-Sevilla
Sogang University, South Korea

##################################

In retrospect however, I owe **Ronald S. Pandolfi** a measure of gratitude. Although quite selfish on my part to suggest, since it very greatly reduced my leadership time relative to the GRAVWAVE TEAM and very unfair to them (Team was: Roger Clive Woods, M.A., D.Phil., D.Sc. (Oxford), FIET; Eric W. Davis, PhD, Andrew Beckwith, PhD, Gary V. Stephenson, Dr. Buzz Aldrin, Bonnie Sue Baker, Frederick W. Noble, Jeannie Hall Moller Fontana, PhD, MD , Robin Fell, Giorgio Fontana, PhD, Gloria Garcia-Cuadrado, Christian Corda, PhD, Professor Fangyu Li, , Zhenyun Fang, PhD, Ammar Sakaji, PhD. Harald Dimmelmeier, PhD, and Kai Lin). If Pandolfi had not slowed down my HFGW research, then I would have devoted **all** my time after 2008 exclusively to HFGW Research and to the GRAVWAVE TEAM. I would **not** have had time to develop my theory of our Universe (that involved no requirement for dark energy or dark matter), of the variation of the speed of time itself, of the Celestial Mechanics truth about the non-human source of Climate Change, of interstellar travel, of the evolution of our Universe, of airborne-drone automated grape harvesting machines, of the imagination subroutine of "Dr. Cyborg" and so on!

##################################

My HFGW research continued even in Spain

In Madrid, Spain, we met with Gloria Garcia-Cuadrado (Director of the *Catalan Aerospace Cluster* BAIE, *Barcelona Aeronautics & Space Association*) and Daniel Ventura Gonzalez Alonso, HFGW Engineering, on May 19, 2009.

Dr. Baker, Bonnie Baker, Gloria Garcia-Cuadrado and Daniel Alonso Daniel

2

I continued to give lectures and author technical papers every few months. For example, at the *Sternberg Astronomical Institute of Moscow State University* on August 12, 2010 at the invitation of Valentin Rudenko and Nikolay Kolosnitsyn (pictured with me and my Son, Robert M L Baker III' Robbie).

Robbie Baker, Dr. Baker and Nikolay Kolosnitsyn 2010

Lots more HFGW activities especially internationally. Bonnie and I even presented several scientific papers together. For example, a paper re coauthored “Multiple-layer radiation absorber” at the *Space Technology Applications International Forum* (STAIFII), Marriot Hotel, Albuquerque, New Mexico, on March 13, 2012, pictured below.

The successful low-frequency gravitational-wave observation of the merger of two Black Holes by LIGO in 2015 spurred research into gravitational waves in general. A more recent HFGW presentation occasioned lectures at the Main Astronomical Observatory of the *National Academy of Sciences of Ukraine* on April 17, 2017, at the invitation of Yaroslav S. Yatskiv. The publication of those lectures represents a good summary of HFGW research as of 2017 and some of them can be found at:

http://space-scitechjournal.org.ua/en/archive/2017/3/05

Robert M L Baker, Jr. and Yaroslav S. Yatskiv at the MAO NAS of Ukraine. April 17, 2017, Kiev (Photo by P. Berczik)

Although well out of chronological order (remember Ralph Waldo Emerson's admonition), I must relate one of my adventures in promoting a completely new project – not HFGWs this time, but a different concept! During the Cold War, there was a value in tracking Soviet submarines by means of towed hydrophone arrays (hundreds of meters in length). My concept was to utilize small unmanned remotely controlled sail craft to do the towing job without the need for hundreds of personnel in manned craft for the same purpose (think that system was called Surveillance Towed Array Sensor System or SURTASS). An old friend of mine was Dick DeLauer. Dick had sponsored my membership in The *California Club* in LA. By the way, that Club was the home of the Economic Round Table (ERT) a group of outstanding individuals each one of whom would provide a 45-minute talk annually. For example, by a Brilliant Inventor, Henry Keck, a fabulous speaker, Nat Read who could present Martin Luther King's famous "I have a dream" speech verbatim! Duke Bristow – even USC has some great professors (now I believe he has seen the light and is at UCLA). And Gil Garcetti, one of LA's greatest DA's whose Son was LA's Major. All my talks can be found at: http://www.drrobertbaker.com/docs/For%20my%20Grandchildren.pdf . And one of my talks, in particular, "BERESHEET", concerning the beginning of our Universe, is in Chapter 9 – please (again) control-click on http://www.drrobertbaker.com/berersheet.html and then click to advance slides.

But I digress (Again!).

DeLauer was an Assistant Secretary of Defense for Research and Engineering and a good friend. I was in Washington at the Pentagon one year promoting my unmanned

hydrophone towing system. Dick said "I like your idea. Why don't I get a few of the 'Boys' together this afternoon and talk about it?" OK, but the meeting was to be at 4:15 pm, Friday and no one wants to stick around then. I walked into a Pentagon Conference Room. On one side of the Table were three Admirals and on the other side four! I commenced my presentation when one Admiral interrupted: "Well, Dr. Baker, I hope you have documentation for that!" I was only in Washington for one night, so I had all my personal items in my briefcase. I clicked my briefcase open to produce the documentation when a fresh pair of my underpants catapulted right down the table!!! Actually, a great way to break the ice! I didn't sell my idea – at least not right there. The builders of SURTASS, that my idea would replace, Hughes, had a strong lobby in the Pentagon and I did not. BUT the Admirals invited me over to a Friday night cocktail party at one of their apartments!

Crystal Chandelier

Has anyone heard of a "*Crystal Chandelier"*? The rum ration was a daily amount of rum given to sailors on Royal Navy ships. It was abolished in 1970, but although there was no similar ration in the US Navy there was pure alcohol in the sick bay and possibly fuel for torpedoes! So, a special drink was concocted using pure alcohol (water comes out of the air at the surface of pure alcohol, so it is never really pure). Cracked ice is the basis and the nearly pure alcohol is so very cold that you do not feel the pain of the pure alcohol going down your throat. "Be careful, Dr. Baker, don't take more than a little sip!" Too late more than that went down – hit my blood stream and, my God! The entire room spun out of control! So be warned: "loose lips sink – well … sailors!"

Science and Global Warming

I have never believed in the importance of politics in science. Apparently, most scientists in the United States are of the Liberal persuasion. On the other hand, as Abraham Pais has stated (1982, *Subtle is the Lord … The Science and the Life of Albert Einstein*, Oxford University Press, p.242): "Physicists – good physicists … are conservative revolutionaries, resisting innovation as long as possible and at all intellectual cost…" In at least one instance I have been involved in political discussion: A good friend of mine, Diana W., is a Progressive Democrat. As aptly discussed in an Editorial in the *Las Vegas Optic*, by Rick Kraft (July 28, 2019, page 41, entitled "This column won't change your mind"), you really cannot change minds by even the most persuasive and factual arguments. So, the purpose of Diane's and my discourse is **NOT** to *convince* or even *advocate*, but rather to *educate* each

other to our differing opinions. We elucidate each other's position in a civil, calm (mostly) and non-offensive manner.

An example of my approach is a discussion we had on "global warming" (as writer of this piece, I only offer MY approach – Diana's is often better, but up to her). For millions of years ice ages have affected our Earth. After them the resulting glaciers have melted BY GLOBAL WARMING! However, there were no humans and their cars, trains, airplanes, or industries present – no anthropogenic effect! By golly, it was Celestial Mechanics that did it! So, let's not be a science denier and instead celebrate Serbian astronomer Milutin Milankovitch who in 1912 linked the ice ages to the gradual cyclical change in the eccentricity (shape) of the Earth's orbit around our Sun. Richard A. Muller of the Lawrence Berkeley National Laboratory and Gordon J. MacDonald of the *International Institute for Applied System Analysis* (I attended his lectures at UCLA in the 1970s), Austria also authored a paper (July 11, 1997, in the Journal *SCIENCE*) on the variation of climate on our planet caused by its orbit. They found that recent ice ages, ten periods of glaciation in the past million years, are caused by the changes in the tilt of the Earth's orbit, called "orbital inclination." Specifically, that "The Earth moves up and down on its orbit plane … and slightly alters the amount of sunlight hitting the Earth. This, in turn, results in variations of climate on our planet." Their analysis shows a clear pattern that exactly matches the 100,000-year period of the ice ages for the last million years! Together, these theories precisely match the change in warmth that archeologists find in the "fingerprints" of the past ice ages! But here is the rub: what is meant by "precisely match"? Their theories give exact matches over thousand-year spans of time – not for centuries – certainly not for any decade! For our current thousand-year span their theories show about a 2 degrees centigrade increase in warmth ON AVERAGE per century. So, for any given decade the increase in climate temperature change might just possibly be 3, 2.5, 2, 1.5, 0 degrees centigrade per century, even conceivably decrease a bit.

To be sure, in Muller and MacDonald's Book (*Ice Ages and Astronomical Causes*) they state "Even if the recent rise in temperatures is natural, human-caused effects have a high probability of dominating in the near future…" But they add: "Fluctuations are evident all over the plot (e.g., Fig. 1.1) and crying out to be understood." Nevertheless, these proven theories for natural celestial-mechanical based global warming should be a central issue in any climate-change analysis.

What to do? 1) Continue research on climate-change prediction including contributions of various sources of anthropogenic global warming, the *largest*

probably being greenhouse gas produced by the World's food-production systems and include the inevitable influence of the Earth's orbit! Inclusion of the estimated error is a must. 2) Based on that study, plan for mitigating activities on our planet for the next several decades such as sea walls, relocating communities, etc., all in a calm, careful manner. It is recognized that we cannot do anything about the Earth's orbit. On the other hand, there may be some new atmospheric technology for climate-change mitigation, such as selectively seeding clouds or dispersing reflective material in our planet's atmosphere that could cool its surface. *Care must be taken here since one man's remedy for his drought may be another man's flood!*

There is a more fundamental concern that I have with the scientists arguing for major human-caused climate change. Science is **not** decided by public debate. Science is **not** decided by majority vote or *Politics*. As I have emphasized, *Science* is decided by experiment and the data derived therefrom! Some proscribe:" …that all politically-enacted laws should be informed by or based upon *Science*." But *Science* is **not** prescriptive and instead involves working hypotheses, which can be modified at any time by new data – ***new evidence***! Again I proclaim: Politicians must be careful not to consider the current scientific consensus or even current evidence as *Absolute Truth* in configuring their legislation!

As I see the debate on Climate Change is, or should be, like the debate on the Theory of Gravity. Prior to 1900 the vast majority of scientists believed in Newton's theory. There were some problems with predicting the orbit of the planet Mercury and a few other anomalies, but the support for Newton was overwhelming. Scientists such as Poincaré had other ideas, but an alternative Theory, the Theory of General Relativity that Einstein proposed, although quite complicated and almost unintelligible to the average person (and to many scientists as well) was put forth. Here again it was subject (and still is) to experimental verification. Now it appears to be the best Theory of Gravity.

Climate Change is likewise not immune to vastly different theories and of course subject to experimental evaluation. As I view it there are at least two fundamental issues concerning Climate Changes:

1. The Earth's orbital effect, and

2. The effect caused by the Earth's living inhabitants.

As I have stated, the first has to do with Celestial Mechanics (as applied to aerospace that is Astrodynamics) and perhaps a Scientific Conference, to include experts in that field, is in order.

The second is more controversial, but as discussed in the editorial in the Journal NATURE (June 20, 2019) in A fresh chance to feed the World "The World's food-production systems generate as much as half the global greenhouse gases …" and should be one of the first subjects of scientific debate! Satellite imaging of the actual sources of CO2 should also be addressed by experts in the aerospace community.

By the way, my sister-in-law and former Executive Assistant, Merrilee Reid (Bonnie's most lovely sister already mentioned), and I submitted the following Op-ed – which I already quoted:

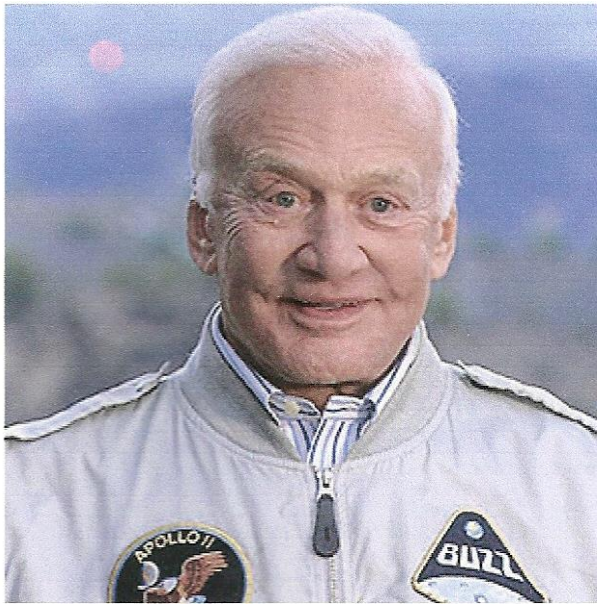
An Inconvenient Truth...

Why over the last several million years did glaciers form and melt every 100,000 years or so? It could not have been human global warming that caused them to melt since there were no people around – no anthropogenic effect. By golly, it was Celestial Mechanics that did it! So let's not be a Science denier and instead celebrate Serbian astronomer Milutin Milankovitch who in 1912 linked the ice ages to the gradual cyclical change in the eccentricity (shape) of the Earth's orbit. Richard A. Muller of the Lawrence Berkeley National Laboratory and Gordon J. MacDonald of the International Institute for Applied System Analysis, Austria also authored a paper (July 11, 1997, in the Journal *SCIENCE*) on the variation of climate on our planet caused by its orbit. They found that recent ice ages, ten periods of glaciation in the past millions of years, are caused by the changes in the tilt of the Earth's orbit, called "orbital inclination.

It was rejected by the *LA Times*, the *Washington Post*, the *New York Post*, the *Washington Examiner* and *The New York Times*. The latter has the motto "***All* the *News that's Fit* to *Print*,**" Maybe motto for newspapers should be: "***All* the *News That We Want* to *Print***", that is, if it fits their preconceived notions! Or, perhaps, we did not write very well. (Or is it "write very good"?)

CHAPTER 11

I'll write a Book!



Gravitational Waves: The World of Tomorrow

a Primer, Third Printing

FOREWORD

I have been a member of Dr. Robert Baker's Gravitational-Wave Team since 1999. However, our relationship goes back further to when I was preparing for my doctorate at the Massachusetts Institute of Technology. Many of us utilized Dr. Baker's textbooks in Astrodynamics. Many of his orbit-determination concepts progressively led to my selection as Eagle Pilot of Apollo XI and to the successful first Moon landing. Those were exciting times and somewhat similar to today. With the launch of Sputnik and my journey to the Moon a new era in the world of tomorrow arrived: The Space Age!

Now, having detected gravitational waves, another new world of tomorrow has arrived: The Gravitational Wave Era! We are now on edge of learning more about the merger of Black Holes from low-frequency gravitational waves detected recently by LIGO. We can learn even more at the higher end of the gravitational–wave frequency spectrum, possibly about higher-order dimensions, multiple universes, how the universe started … the Big Bang, or perhaps, "The Big Rollout"!

But now of even greater practical importance is the potential use of high-frequency gravitational waves for communication. Since, like gravity itself, these waves go through all matter unattenuated, not absorbed like microwaves. They propagate almost without absorption though interstellar space – and, for example, could convey messages from the star Antares to Earth or from Mars cyclers back to Earth. The high-frequency gravitational wave advantage would be that direct communication can be maintained without relays even if Mars or the Moon is between the cyclers and Earth. Here on Earth, there would be no need for microwave or cell phone stations, cables or even relay satellites – the ultimate wireless system!

However, that is not the main reason I recommend your reading this book. I believe what the world needs are not many more highly trained scientists and engineers, but a greater knowledge of those of you without advanced scientific university background, businesspeople and others with only high school training in science and mathematics. All of us should achieve some fundamental understanding of the basics of science and engineering now that understanding should include gravitational waves. That is the purpose of this very instructive book and I strongly urge you to read it.

Dr. Buzz Aldrin

It went through THREE PRINTINGS! For more on the Book, reviews, errata, etc. please see:

http://www.drrobertbaker.com/docs/GRAVITATIONAL%20WAVES%20by%20Robert%20Baker%20v8.pdf

GRAVITATIONAL WAVES The World of Tomorrow, a primer. Published by INFINITY PUBLIHING West Conshohocken. PA 19428-2713, www.buybooksontheweb.com By Robert M L Baker, Jr. 2017, ISBN 978-14958-1182-1 eBook.

Highlights of: *Gravitational Waves: the World of Tomorrow, with Exercises* - by Robert Baker,

Third Printing, July 4, 2017.

- Chapter 1 discusses the 4-dimensional **Spacetime**
- Chapter 5 summarizes the history of gravitational-wave research.
- Chapter 8 discusses the natural sources of high-frequency gravitational waves (HFGWs), e.g., in cosmology.
- Chapter 9 describes the practical fabrication of a high-intensity, laboratory generator or transmitter of HFGWs. *
- Chapter 10 describes eight detectors of high-frequency gravitational waves that were in operation, are now in operation or planned to be in operation.
- Chapter 11 is interesting because it mentions multiple universes, quantum jitters and time travel developed in a fanciful thought experiment of a

horserace, when one universe osculates with another at a frontier between them!

* A possible 500 GHz HFGW generator could be constructed from 8.86×10^{21} miniaturized, but standard and subject to substantial improvement, FBARs or MEMs, fabricated using a nano 3D printer. It would be about 76. 5 meters in length and 39.5-meter radius and produce approximately 1.08×10^{-30} GWs detectable by the Li-Baker detector at one meter. Size may not really matter since each LIGO leg is 4 kilometer long and several meters in diameter. Also, CERN is 27 kilometers around!

CHAPTER 12

(Watch Out! Some heavy Cosmology is coming – might consider skipping!)

What Time is it?

At this point in the story, I am not sure if I really have anything more to include. But, in any event, allow me to set the stage in more detail than I did previously in Chapter 9. Sit back, this Chapter may be a long and perhaps redundant or complicated one!

As I already discussed in Chapter 9, in considerable detail, in the 1960s through the 1990s, while teaching Astrodynamics, Astronomy and Engineering at UCLA and WCU, wife, Bonnie, and perhaps others, questioned a new theory, developed by Alan Guth at *Cornell University*, that our Universe was "inflating" and that in a remarkably short time of 10 to the -34 seconds or 10^{-34} s (one divided by 10,000,000,000,000,000,000,000,000,000,000,000 seconds) the Universe became the size of a marble. As I have stated, working the arithmetic out indicated that the material of the Universe, if containing information, had to be moving on average over 10 to the 23rd (10^{23} or 1 with 23 zeros after it[j]) times the speed of light or maximum speed of information! I usually answered those student queries about that peculiar situation by suggesting that the dimensions of time and space were just "unrolling out" and the concept of speed was irrelevant. Then, exactly like much later speculated and published in the *Physics Review D* on January 11, 2008, by Jose Senovilla, Marc Mars, and Raul Vera, on the slowing of time during the expansion of our Universe, it occurred to Bonnie and me that time itself may be running fast at the beginning of our Universe and that the speed limit of light or information might not actually be violated in our early Universe! That is, as I have previously noted, if time were running fast in our early Universe, then the speed of light measured there would not be greater than the "speed limit" of information. If the time in our early Universe were moving really, fast **then it might still be slowing down and we**

might be experiencing its "tail" today! Poincaré and Einstein both proposed a revolutionary concept that time need not move uniformly and regularly as the rate of movement of a pendulum, but that its "rate" could appear to change based upon relative speed and acceleration of clocks. Therefore, the concept that one can have a changing speed of clocks in our Universe is not unusual. To clarify, I will use the following example (you can find it on page 54, footnote 5 of the reference given in Chapter 10: and published in *Space Science and Technology Journa*l, Volume 23, No 3, p, 47-63. doi: https://doi.org/ UDC 530.12:531.51 http://space-scitechjournal.org.ua/en/archive/2017/3/05)

As suggested in Appendix II suppose you are a trainer of a runner who you just measured as doing a four-minute mile. Another trainer says that cannot be correct. "Your runner could not have improved that much; your stopwatch must be running slow since we all measured that he only ran a five-minute mile last year." Well, you argue "No, he has not improved at all, he ran at the same *intrinsic* speed as last year. You all had stopwatches that were running fast and miss-measured my runner's speed last year!" In this case last year's stopwatches were moving 5 minutes/4 minutes = 1.25 minutes/minute times faster or one minute 60 seconds per 24 hrs. = 86,400 seconds = 0.000,69 seconds per second faster (or on a yearly basis 1.9×10^{-6} seconds (1.900,0000 picoseconds) per second faster). Just to be clear, usually the stopwatch would show 4 minutes for him to complete the mile, but on the faster second-hand watch used by the trainers' last year. The second-hand speeds along (the second is effectively shorter) and, at the finish line the second hand, for them has quickly reached the 5 minute point!

Suppose all the stopwatches have been running fast in the past are now slowing down. Perhaps caused by a systematic mechanical malfunction in ALL the stopwatches (*time measurement devices)* or more likely **because *time itself is slowing down!*** Consider the following Table that shows the same mile runner's times to run a mile over several years*:

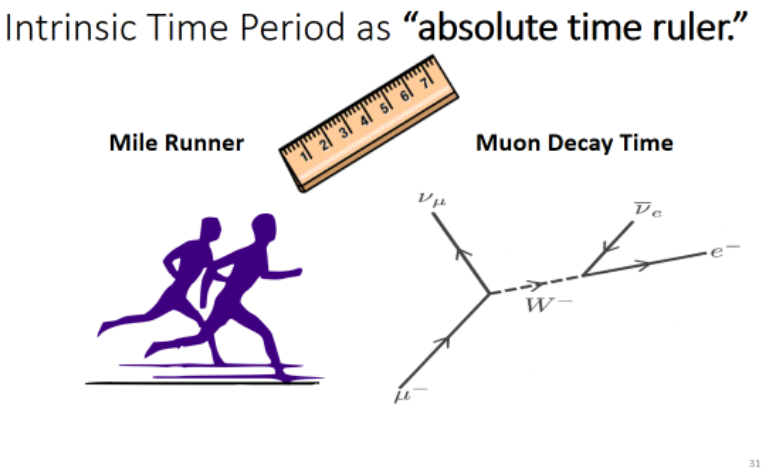
TABLE 1

Year	Same Miler's Measured Run Time Minutes*	Stopwatch Time (Fast or Slow)
2015	7.0	Running Super-Fast
2016	6.0	Running Very Fast
2017	5.0 (Last Year)	Running Fast
2018	4.0 (This Year)	Today's Speed

In order for a complete analogy to the same (invariant) "intrinsic speed" of a particular mile runner, one would need many replicant mile runners identical to that particular mile runner and a new one for each of the annual mile races.

Continuing to utilize the foregoing concept, Bonnie and I looked around for some way to measure the speed of time and came up with the Muon decay time period as an "absolute time ruler" or "yardstick" (name coined by Professor Giorgio Fontana, who Bonnie and I had met in Italy at the *Villa Fontanelle* on Lake Garda). The possible consequence of a slowdown of the speed of time in our Universe is that if

Muon decay time, which is very accurately measured out to 8 or 9 significant figures, is a "constant" independent of the time measured in our Universe or "yardstick", then it could be used **exactly like the intrinsic time of a replicant mile runner could be used as a yardstick!**



Then I set about researching for Muon decay time measurements. The following Table is the result of my analyses or discovery:

Table.	**Review of**	**Length of**	**Muon Decay Time**	**Versus Time**
Date of Measurement	Muon Decay Time (Picoseconds)	Estimated Error (Picoseconds)	Muons at Rest or in high-speed Cosmic ray generated motion?	Reference
1946.0	2,330,000	±150,000	At Rest	Conversi, Pancini, Piccioni [1]

1962.0	2,203,000	±4,000	At Rest	Lindy [2]
1963.0	2,202,000	±3,000	At Rest	Eckhause, et al. [3]
1973.0	2,197,300	±300	At Rest	Duclos/ Chin. Phys. [4]
1974.0	2,197,110	±80	At Rest	Balandin/ Chin. Phys. [4]
1984.0	2,196,950	±60	At Rest	Giovanetti/Chin. Phys. [4]
1984.0	2,197,078	±73	At Rest	Bardin/Chin. Phys. [4]
2007.0	2,197,013	±21	At Rest	Chitwood/Chin. Phys. [4]
2008.0	2,197,083	±32	At Rest	Barczyk/Chin. Phys.[4]
2008.5	2,197,030	± 40	At Rest	Coan & Ye [5]
2009.5	2,196,980.3	±2.2	At Rest	Webber/MuLan [6]
2013.0	2,196,980.3	±2	At Rest; a copy of 2009.5 measurement	Tischchenko [7]

2015.0 [2]	2.110	±70,000	Fast, Cosmic Ray[1]	Barazandeh [8]
2015.0 [2]	2.1650	±403,000	Fast, Cosmic Ray[1]	Barazandeh [8]
2016.0	2,078,000	±11,000	At Rest	Physics Open Lab [9]
2017.0	2,080,000	± 11,000	At Rest	Adamstown [10]

[1]Since the Muons are not at rest these two measurements will be neglected. However, their decay times are longer than the recent 2016- and 2017-time measurement due to time dilation and tend to validate these two recent measurements. Moving clocks run slow due to time dilation, so Muon decay time observed in an At Rest, ground frame of reference is longer. A picosecond is a trillionth of a second, or 0.000,000,000,001 seconds.

To my amazement I found that from 1946 to 2017 a dozen or so measured Muon decay times, exhibited in the Table, all shortened from very roughly 2.330 microseconds (1946) to very roughly 2.202 microseconds (1963) to very roughly 2.078 microseconds in 2017!

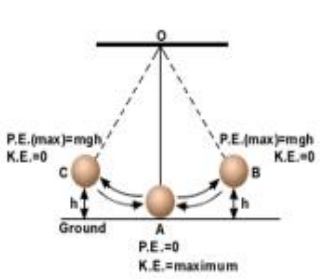
More detailed inspection of the Table revealed that the combined results (circa 2009-2010 or 2009.5) due to MuLan atomic-clock measurements give Muon decay lifetime = 2,196,980.3 (±2.2) ps, which is more than a dozen times as precise as previous experimental measurements. The previous 2007 determination given in Olive/Chin. Phys. by Chitwood (in 2007) of 2,197,013 (± 21) ps and depicted in the Table, show a decay time shortening, with respect to the MuLan value, of **-33 ± 23** picoseconds, which is the *far more precise calculation*. (The variation in decay time over 2007 to 2009.5 is quite small as a percentage: (33ps/2,197,000 ps) × (100%/2.5 yrs.) = 6×10^{-4} % per year.)

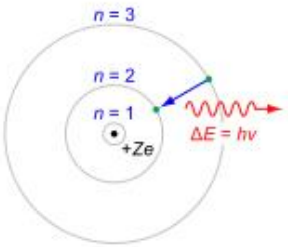
There may of course, be many possible causes for the Muon decay time shortening if indeed that shortening truly exists (and I believe that it does). One such speculative cause that is suggested by the foregoing discussion is the

PROPOSITION that some complex processes or sub systems are "marching" to their own intrinsic "time" or timeframe that is independent of the flow of "time" in our Universe; essentially it is a Non-Varying- Rate-of-Time or NVRT Process, working hypothesis or concept.

By "complex" is meant those transient processes or subsystems that involve one or more quantum mechanical sub-reactions, some well understood and some not well understood, that in total comprise a complete, possibly multiple-step process or quantum mechanical subsystem having a well-defined beginning and end except may not depend upon the dimensions or space part of the spacetime continuum. But even if the Proposition is correct, then should not the very clocks that are utilized to measure Muon decay lifetimes also change speed and operate on the same timeframe as Muon decay? **No**; unlike the *intrinsic or complex* decay time of a Muon, one second is defined as the time that elapses during transition between two energy levels of the cesium 133 atom. Also, Muon decay **time** is unlike the period of a pendulum, which depends on its space dimensions such as length and the location-dependent strength of gravity (essentially, the change between potential and kinetic energy levels). Such cesium-atom energy level changes and pendulum swings, essentially timed energy-level changes (somewhat like a rock falling a given distance as a time interval definition), are the *dimension-independent* "stopwatches" of our Universe and can be utilized to measure the *apparent* duration of Muon decay and thereby possibly determine the "speed of time" in our Universe.

Are the Clocks, which we utilize to Measure Time in Our Universe, Transient- Process Sub Systems like Muon-decay Time ? No! They are Simple Energy-level Changes Similar to Dropping a Stone as a Measure of Time Interval.

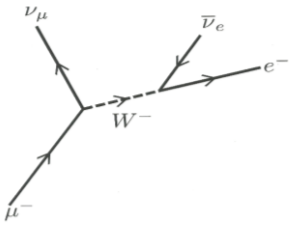


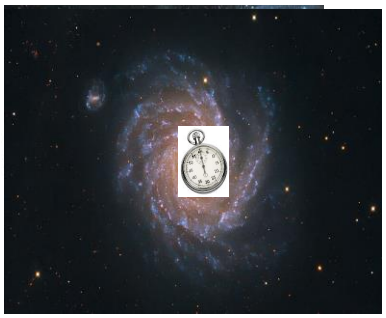


I sought some theoretical basis for my Proposition. That theoretical basis was provided by Professor Andrew Beckwith in Section XVII of: http://www.drrobertbaker.com/docs/Beckwith%20%282017%29v2%20History%20Lesson%20from%20the%205th%20Solvay%20Meeting.pdf

Another way to look at it is to consider a timeframe of Muon decay **A (a sub-system)** and the Universe timeframe **B (a macro-system)** as in the following sketch:

A **B**





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Subsystem A only dependent on the time dimension and the time & space-dimension dependent Macrosystem B (Universe as typified by the seemingly rapid rotation of galaxies, like the rapid rotation of the hands on a clock)

The working hypothesis is **not** that the intrinsic Muon decay time (or any other electro-weak decay time) is decreasing with time. **Rather the working hypothesis is that the intrinsic Muon decay time <u>is constant</u>, but the clocks on Earth are slowing down!** (A "working hypothesis" is hypothesis that is provisionally accepted as a basis for further research in the hope that a tenable theory will be produced, even if the hypothesis ultimately fails.) As opposed to Muon decay time, the speed of time effect may be quite subtle: since the previously "assumed" "Big Bang" (1.38×10^{10} years ago) the time has "changed" **only** (33 ps/2.5 yrs.) × 1.38×10^{10} yrs. = 0.18 seconds! Of course, it is speculated that this speed change is just the tail of a series of time-speed changes, time slowing down, over the billions of years (perhaps much "shorter years" as would be measured today) since the "Big Bang." Please review the diagrams in Chapter 9. The published analyses of Vaas, Beckwith**,** Fontana, Karimov, Mars, and Bars support such a hypothesis. What is new is my *discovery* that the intrinsically constant Muon decay lifetime, which is **apparently** decreasing, is a quantitative "yardstick" or absolute time ruler that can be utilized to establish the local speed of time on the Earth and/or Universe! This absolute time

ruler is, of course, not absolute in the sense that it is not measured against a perfect clock since **there is no perfect clock** – simply that there are different clocks running at different speeds in different locations and one can only measure them against another "clock" such as today's clock running at today's speed or another clock such as one intrinsic to Muon Decay Time running at its intrinsic, only time-dimension-dependent speed!

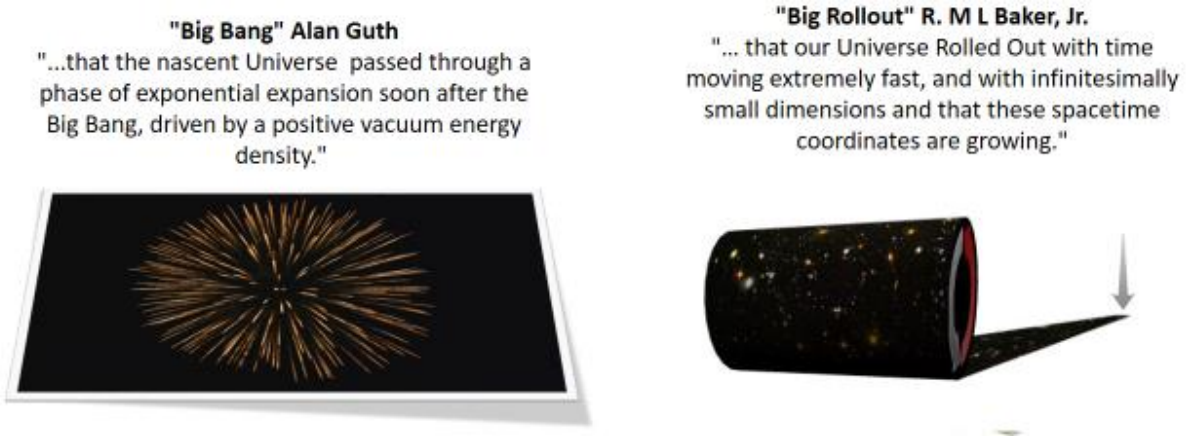
In support of my working hypothesis, Professor Andrew Beckwith wrote in a technical paper of his: "However the issue Dr. Baker has raised is suggestive and should be thoroughly analyzed. The author (Beckwith) finds that aside from inevitable scaling arguments, that the Muons are still a sub system, within a larger general system. I.e. the adage of Schrödinger who postulated that quantum sub systems, of a macrosystem definitely exhibit quantum mechanical time dependent behavior. Equation (51) is not quantum mechanical, but it is a sub system, and so the same rule by Schrödinger, as to **sub systems exhibiting definite time dependence**, may be applicable here. I.e., **think in terms of time variance**."

One outcome of my change the speed of time concept was mentioned in Chapter 9:

That our Universe started as a big rollout of spacetime from vanishingly small space dimensions and infinitely fast speed of time to today's values; testable by detection of relic high-frequency gravitational waves.

Maybe the time in our Universe is still slowing down I thought. If so, then the reduction in Muon Decay Time I speculated might be a means to observe my Theory of the Universe TODAY!!!

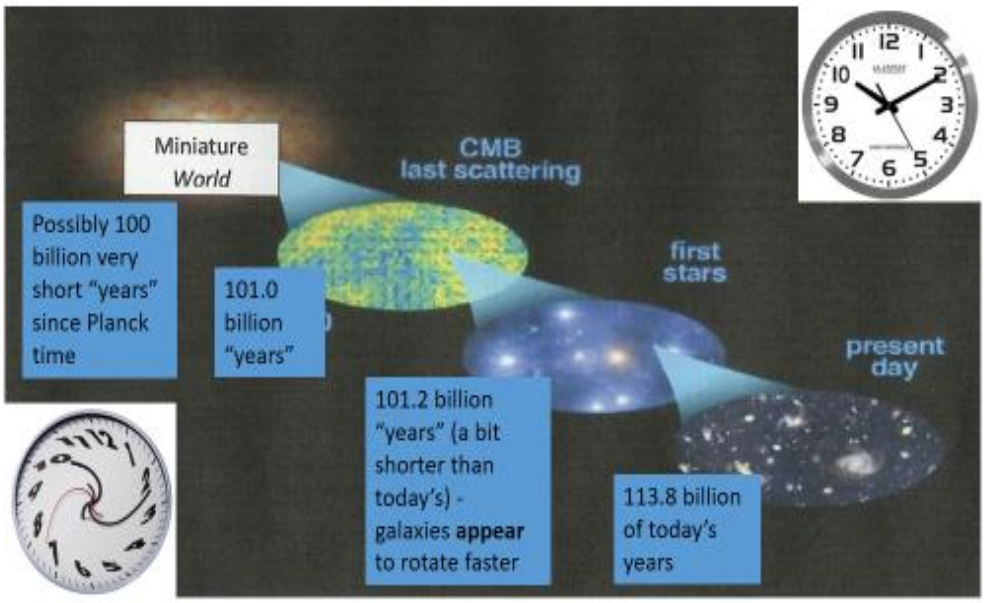
As I have already indicated in some detail, at this time (2019) the most accepted theory of our Universe was suggested by Alan H. Guth of *Cornell University*.



Let me continue my speculation in Chapter 9 that time started out at almost "zero" or Planck time, was moving very fast and then slowed implies that from OUR point of view or time "our time" the years (or any measure of local time, e.g. seconds , hours, centuries, etc.) were much shorter in the past. So that near Planck time the "year" would appear extremely short, say a picosecond, IF WE WERE ABLE TO VIEW A STOPWATCH BACK THEN THROUGH A TELESCOPE! That would make the "age" of our Universe tremendously older than 13.6 billion years. Of course, according to my Proposition some processes, such a Muon decay or possibly photons (bosons) decaying into matter, that progress at their own rate (NVRT or "march to their own drummer") would appear take much longer e.g., not 2.2 microseconds, but perhaps billions of "years" – their years! Therefore, our Universe would require a very long "time" (their local time) to mature or develop due to very slow "growing processes"! Our Universe may be extremely old but remained a very "immature baby" for a terribly long time!

By the way, my new Rollout Theory does not depend upon the corectness of the PROPOSITION or the change in Muon decay time. Those concepts would of course, serve as a convienent means to measure the speed of time locally.

Development of our Universe involving the speed of time from a diagram by Fangyu Li



Viewing processes at past times today would see them moving with different rates depending upon the speed of time "back then." For example, if the Cosmic Microwave Background (CMB) may have "occurred" about 400,000 years after the beginning of our Universe, then we would see separation motion of the cosmos commensurate with the speed of time then. Specifically, $6.75 \pm .05 \times 10^4$ m/s per Mpc (mega parsecs or about 3.3 light years). But as already proposed the Cosmic Microwave Background (CMB) is essentially Black-Body radiation from what has been called a "snapshot" of the beginning of our Universe. As noted in Chapter 9, I view it not as a snapshot, but a very compressed time segment of our Universe. It is like the frames of a movie all piled up together one frame on top of the other! What do see when all the frames of a movie are displayed at almost one time? You get BLACK -- literally a "Black Body" You see a faint cosmic background radiation filling all space – literally billions of years piled upon billions of years of very faint, very faraway stars! But suppose it is not from a 'gas' that later on formed stars and galaxies.

In 1929, Edwin Hubble discovered that our Universe is expanding, with most other galaxies speeding away from us. Light from these galaxies is shifted to longer and redder wavelengths – in other words, their light is **red-shifted**, a result of the stellar increase in stellar separation speed involved in the expansion of our Universe. We

view the Cosmic Microwave Background (CMB) with radio telescopes: the shift to wave lengths or lower frequencies of even longer 3×10^{11} to 3×10^{8} Hz is an "**extreme *red shift***"! We believe it is due to the **apparent** high separation speed of stars and galaxies caused directly by the much **higher speed of time** as the beginning of our Universe is more closely viewed; for example, ***as the Cosmic Microwave Background is viewed!***

Furthermore, according to our working hypothesis this separation speed of cosmic objects (essentially termed the Hubble "constant") would be far smaller than separation speeds and, hence the speed of time far smaller near Earth than at a time closer to the beginning of our Universe. As discussed, this speculation is consistent with our observations of the CMB and could be tested by the measurement of HFRGWs from picosecond or less duration processes occurring in the very early universe. We also we have speculated that although the speed of time slows down tremendously after the beginning of our Universe, it could pause, decrease, or even increase later on. Specifically, several billion years after the beginning of our Universe it could have decreased or increased somewhat. Therefore, reflecting a slight decrease or increase in the speed of time. However**, no "Dark Energy" or "Dark Energy" need be assumed.**

Samuel Herrick, my mentor at UCLA back in the 1950s, had an idea. He effectively incorporated the mass of an orbiting object, the mass of the object that is being orbited about and the Universal constant of gravity, G, into time he often called "Tau Time". For this reason, whether the mass is associated with regular or Dark Matter is not of consequence. Of course, Herrick had no knowledge of "Dark Matter." As far as galactic motion is concerned, if one can incorporate the concept of "matter" or "mass" into a two-body orbital relationship, then multi-body or "n-body" motion, such as a galaxy would follow. In my working hypothesis on time, galactic motion can be by predicted utilizing a speed of time local to a galaxy (like "Tau Time") without the need for Dark Matter. That is, you determine the speed of time as the independent variable observable as fitted to the measurements of the galactic motion using differential correction. But one must **only** utilize the images of stars observed as part of the galaxy arms and **not the faster-moving background stars** that is, stars that a farther back in space and time nearer the beginning of our Universe**!** Specific numerical details of similar analyses are found in "Detection and Determination of the Variation of the Speed of Time," by Robert M L Baker, Jr., Bonnie Sue Baker and Fangyu Li, *Journal of Modern Physics,* Vol.**12**, No. 6, May 2021 (see the actual article at the end of Appendix II).

As I have related, in the 1990s, as part of West Coast University's Master of Engineering program, I lectured on my Rollout Theory of our Universe. Later in 2017, I formally lectured on the topic at a breakfast meeting of the Economic Round Table (ERT) at the *California Club* in Los Angeles. As discussed, this Theory involves the speed of time as initially suggested by Bonnie. That is, like time moving fast or slow like an aberrant wristwatch being too fast or too slow. Specifically, time starts out near "zero", or Planck Time, at a high rate of speed. New mysteries: immediately arise: How does the speed of time vary with time itself and is there a detailed structure to that change? Does the speed of time change depend upon location and "surroundings" in our Universe (e.g., is it unique to the Earth, change with the density of local matter, or features of spacetime, etc.) and if so what is the relationship? What is the actual theory for the change of the speed of time, that is, what is its cause? Is there a starting point for time? Why is the direction of time arrow in a single direction? Are there two oppositely directions of time flow? Is such a starting point in time an osculation point with other universes as I have suggested? Although I discussed my Universe and time theories when I initially wrote my textbook in 2015 (First Printing, 2016) I did not formalize it, so let me again present it formally here:

R. M L Baker Jr.'s Theory of Our Universe and Speed of Time (A Working Hypothesis):

Our Universe is a rollout in space and time, spacetime, from the shortest length, Planck Length, (the smallest measure of length because shorter than it, quantum effects dominate) and the shortest meaningful measure of time, Planck Time (the time it would take a photon travelling at the speed of light to across a distance equal to the Planck Length). It is speculated that space dimensions grow very rapidly at first (spacetime dimensions initially rolling out near light speed) and that time grows very rapidly at first. As time increases, the rate of its change could be erratic, that is although in general it slows (rate of time slows approaching zero at the end of time), its rate of change could decelerate, pause, *or perhaps*

accelerate for a while since there is no ***www.merriam-webster.com*** *› dictionary › a priori*[A]

priori Definition & Meaning - Merriam-Webster

A prior

reason for constancy. Like in the Big Bang Theory, originally there was a lot of energy in the form of "light", electromagnetic energy or photons. According to current particle theory photons are one of a class of particles called "bosons", which decay into actual matter.

The relationship between the change in the speed of time and the change in the space dimensions is important since they rollout in concert to preserve the constancy of the speed of light. At the beginning of our Universe the (change in the space dimensions) divided by the (change in the speed of time) equals (zero to the Planck Length during Planck Time) / (zero to Planck Time during Planck Time), which equals the (speed of light). It is speculated that this ***fundamental equation*** *is correct and endures so that formally the equation is, from the beginning:*

(change in the space dimensions) = (speed of light) × (change in the speed of time dimension)

In addition, it is speculated that quantum mechanics is the boundary or initial condition for our general relativity behaving Universe of today. It is also speculated that the beginning of our Universe could be the osculating point with other universes.

More about a "Working Hypothesis"

A working hypothesis, although mentioned throughout, is defined very specifically (Wikipedia) as a hypothesis that is provisionally accepted as a basis for further research in the hope that a tenable theory will be produced, even if the hypothesis ultimately fails or is significantly modified (Isaac Newton's *Principia Mathematica*, as significantly modified by Einstein, is an example). It is essentially an encouragement for further research and analyses. Most scientific theories are working hypotheses – **NO** ALL-scientific theories are working hypotheses!

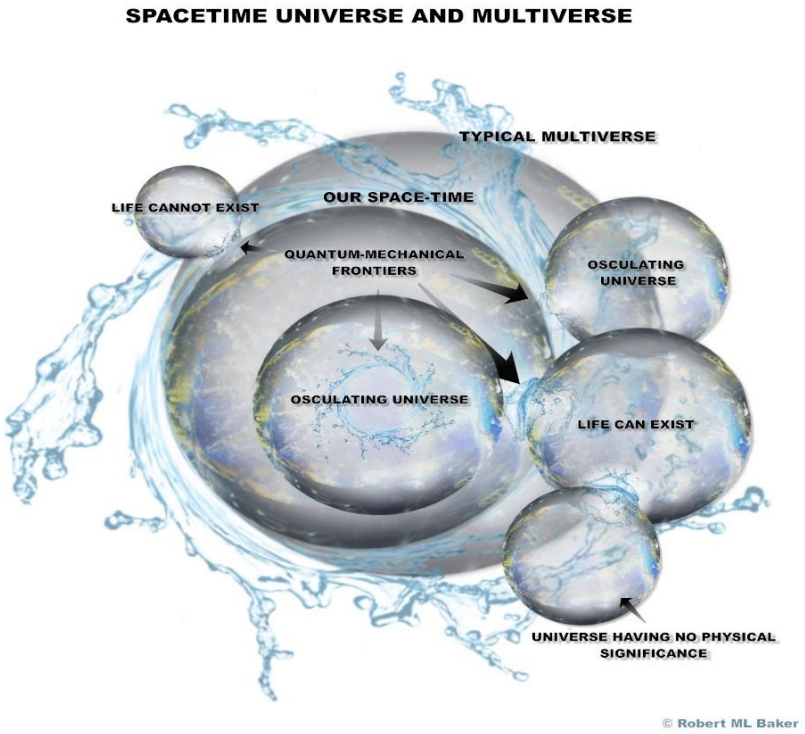
Like other cosmological theories, especially of the early universe, they should agree with observations. Since our working hypothesis suggests that the pace of time was faster in the past, galaxies would appear to rotate faster, and stellar material could vary their rate of separation (measurable observables of the speed of time). Our working hypothesis is compatible with both observations as it is with observations of a relationship between redshift and the inferred distance of faraway galaxies, the existence of a microwave background (CMB) an "**extreme *red shift***"! with a blackbody spectrum, etc. In fine, there would be no reason to introduce extraneous features to our Universe such as Dark Matter and/or Dark Energy, both of which have defied detection. Our working hypothesis is also compatible with the assumption of homogeneity and isotropy of space and primarily relates to phenomena occurring much less than a second after the beginning of time. (As to "matter" dark or otherwise, like in the Big Bang Theory, originally there was a lot of energy in the form of "light", electromagnetic energy, or photons. According to current particle theory photons are one of a class of particles called "bosons ", which decay into matter. *)* Specifically, I am interested in time approaching Planck Time (about 5.39×10^{-44} seconds), and the initial rollout speed of space dimensions (about the speed of light, 3×10^{8} meters per second). A notional graph of the change in the speed of time can be found in Chapter 9. In all frames of reference, the speed of light is constant, and the "Laws of Physics" apply. As suggested in Chapter 9 please again see the second half of: https://youtu.be/3UcJfvfoQIQ for a video that includes my working hypothesis and artificial knowledge. It was produced by a French scientist, Mourin Belgacem. Like I am, he is blessed by having a beautiful wife, Sabina, but better yet he read my *Gravitational-Wave* book cover to cover! To validate our working hypothesis, it would be useful to make observations at very sort times after the beginning of our Universe, a picosecond or less after "time zero." For that reason, Terahertz or higher frequency HFRelicGWs observations involving the fine structure of the expected spectral shift (due to both the inflationary and my speed-of-time theory) would be extremely valuable.

Mounir Belgacem and Bonnie Baker, Paris, France (2017)

At this point my story (remember Emersions admonition about the foolishness of chronological order) it was the late 1990s and, as noted in Chapter 5, I was working with Fred Noble on a giant flywheel device to store energy for his wind-turbine farm in Palm Springs, California. We decided to patent it. Since I was also analyzing my new Theory on the beginning of our Universe I thought "Why not get some of the ideas on my new Theory into the Patent?" Well, I thought, gravitational waves are generated by the orbiting ("rotation") of stars and black holes so why not consider the miniscule number of gravitational waves generated by our giant flywheel? This thought lead to a section near the end of our Patent on "**Spacetimeuniverse Geometry**" and the conjecture that the "intractable frontier between a smooth spacetime (universe) fabric and apparent, quantum-mechanical `frenzy` at small scales" [Brian Greene (1999), *The Elegant Universe*, Norton, N.Y., p. 129] is nothing more or less than *the interface between osculating universes* at the "beginning of time" (in my Theory, near Planck Time) in which entities shift back and forth at will! Possibly smooth transitions from one osculating ("touching") universe to another with mass/energy and momentum conserved and entropy constant (but the speed of time may or may not be translated), as discussed in United States Patent Number 6,160,336, filed on November 19, 1999, and granted December 12, 2000; section on **Spacetimeuniverse Geometry**. This Patent memorialized the concepts developed during my UCLA Lectures in 1950, 1960 and 1970. I will now paraphrase that section:

"All universes are not necessarily viable: some may be massless, some may be of no physical significance, and some may have no chance at all to lead to life as we know it. According to this conjecture or working hypothesis, the intractable frontier between a smooth **Spacetimeuniverse** fabric or geometry and apparent, quantum-mechanical `frenzy` at small scales (such as Planck Time and Planck Length) is nothing more or less than the interface between osculating universes in which entities could shift back and forth at will--actually smooth transitions with mass/energy and momentum conserved and entropy constant, (as I wrote: speed of time may or may not be translated) possibly at the initial condition or "birth" of Multiuniverses" or even at other frontiers."

The following schematic illustrates my concept and could be defined as the "Fifth



Dimension":

In any event, my concepts are now formally published! Specifically, as already noted in *Journal of Modern Physics*, Vol.**12**, No.6, May 2021, pp. 761-780, the actual article can be found at the end of Appendix II.

In the foregoing analyses we find an example of an ordinarily unexpected observation (the apparent decrease in a Muon's decay time) leading to a series of

consequences (speed of time slowing) that reminds me of an earlier (again please recall Ralph Waldo Emerson's paraphrase regarding chorology and time) unexpected "observation." In this case, the unexpected observation was hearing an alarming "MAYDAY!! MAYDAY!!" late in the evening when we lived at the Marina del Rey in the 1960s. This "observation" led to a series of unexpected consequences. Apparently, someone had fallen off the dock into the Marina and was calling for help. I immediately phoned ***the*** *Los Angeles Police Department* or *LAPD* for assistance! They told me: "Please call the *LA County Sheriff's Office* who have jurisdiction." That call had the response: "Thank you, but please phone the *Harbor Patrol*!" The *Harbor Patrol* insisted that the *US Coastguard* was the responsible party, and I must notify them immediately – I did! Then *LAPD* sirens were heard coming to the Marina. Behind them came the sirens of two *Sheriff's Office* squad cars, then a noisy *Harbor Patrol* speedboat appeared near us in our Marina Bay. Close behind raced in a *US Coastguard* Cutter that sounded a loud announcement: "Emergency! Emergency! A Dr. Baker has reported a drowning off a nearby pier!" Having found no such drowning, since the victim had undoubted pulled himself out of the water, all vehicles and boats pulled out. But to my great embracement apartment lights were switched on all along the nearby harbor front! Of course, they were soon extinguished, but toilets flushing sounds continued. Hopefully, if my Muon-decay-time change observations prove true, then they will not have unfortunate unintended consequences!

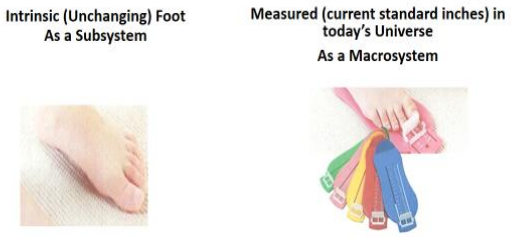
IS THERE A PERFECT CLOCK OR SOME KIND OF "ABSOLUTE TIME"?

The answer, as I stated previously, is "***no***." As Gyorgy Buzsaki and Rodolfo Llinas in their article on "Space and time in the brain," state "… neither clocks nor brains make time per se." One might consider the transient complex process subsystem discussed herein, *itself* as a clock – e.g., an alarm clock. The problem is you cannot "read" it. If you ask Chef Bonnie Baker "When will the bread being baked be ready?" She might reply "I don't know exactly." I would ask then, "How do you know when it is finished and take it out of the oven?" Chef Bonnie might reply "I stick a toothpick in it and if some dough no longer sticks to it, then its cooking process is over, but I do not know exactly when that will happen. I cannot read it like a clock you know!" Even if the Proposition proposed herein is false, in the context of the light cones described in Chapter 2 of my textbook on Gravitational Waves there is the *impossibility* of distributing "polling-place clocks," which have

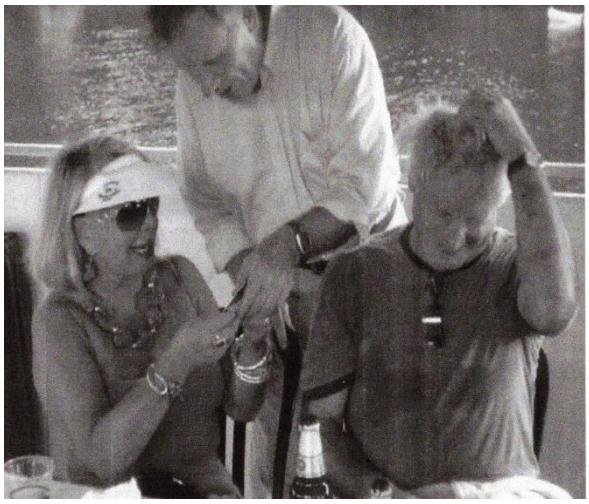
exactly “polling-place” or absolute time, due to the special and general relativity effects as they are transported to various locations. Even if we attempt to set them by radio signal, since we have imperfect knowledge of the speed of light (and no exact location because of Heisenberg’s position uncertainty), it is impossible to accomplish the setting exactly. **Time is really relative!**

"An alleged scientific discovery has no merit unless it can be explained to a barmaid." Says Einstein. Guess what? I do not have a barmaid to test my “discovery”, but I do have Bonnie. My explanation, above, was **not** clear enough to her! “What about a women’s shoe size?” She spoke. “My shoe size goes up a little each year from size 6 when I was young to size 7-1/2 now. I do not think that my ‘intrinsic’ shoe/foot size has changed at all, but the measuring device they use on my foot has indicated that it changed” So I stated; “Maybe like time, space (including the dimensions measured of your foot) are subject to change since the beginning of our Universe so the ‘foot measuring device’ like atomic clocks (time measuring device) are measuring your foot using, shall we say using current *standard* inches.” -- “OK, I get it. Arguably, my intrinsic foot has not changed its size, but our Universe has changed the ‘standard inch’ like the ‘standard’ meter or standard second (as measured by an atomic clock) and my foot only *appears* to have grown. Whew that is a relief, but remember I told you time could move at a variable speed!”

Bonnie’s Foot Size



All kidding aside, Bonnie has a wonderful scientific mind. We have coauthored papers on Exoplanets. Being a great chef, she developed the bread-baking analogies in my Rollout theory. From about 1990, when I commenced filing patents, to today she has been instrumental in the development of the speed of time (she **thought of it**) and its relationship to our early Universe! In the next picture we find Bonnie with the reknowed Russian scientists Valentin Rudenko and Leonid Grishchuk. Leonid is no doubt pondering Bonnie’s’ discussion with him earlier on the Rollout Theory of Our Universe!



With regard to exoplanets, I recall the words of Alfred Lord Tennyson: "So many worlds, so much to do …" Similar to our joint research on the Rollout Theory we coauthored a paper entitled "Application of High-Frequency Gravitational Waves to the Cataclysmic Event of Our First Encounter with Intelligent Extraterrestrial Beings," in the *Journal of Applied Mathematics and Physics* (Volume **4**, No. 4, pp.110-129, 2015. You can find it by CTRL- clicking: http://www.drrobertbaker.com/docs/JAMP%20v7-1720448%20.pdf).

Our Galaxy (and there are 100 to 200 billion galaxies in our Universe) contains at least as many planets as stars and there are 200 to 500 billion stars per galaxy! Thus there may be as many as about 200,000,000,000×500,000,000,000 = 100,000,000,000,000,000,000,000 (= 10^{23} or one followed by 23 zeros or one hundred sextillion) Exoplanets out there! That does not mean that every star has a planet, but one may have 8 or 9 like our Sun, some may have none, some may have 12 or more, but on average about one exoplanet per star. The so-called Enrico Fermi paradox in which civilizations "blink" on and off and there may never be two advanced civilizations "operating" or "intercommunicating" at any given time. Therefore no AOP's could be UFOs from an exoplanet civilization! But the significant concern is the possible number of successful round trips of interstellar messages or interstellar travel while both "sending" and "receiving" civilizations **are still viable** as Bonnie and I showed in the following drawing:

Exoplanet Advanced Civilization Time Line or String (A to C: 2-5 billion "years")

- A beginning of exoplanet's life
- B beginning of advanced civilization 
- C very advanced civilization 

From B to C:

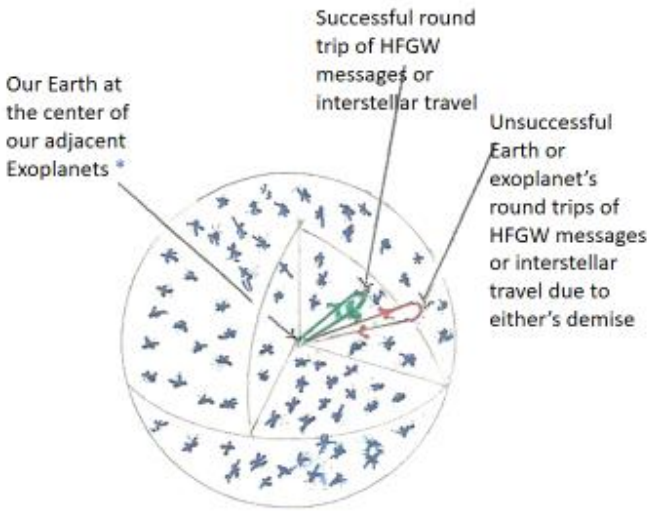
Artificial Education

Artificial General Intelligence

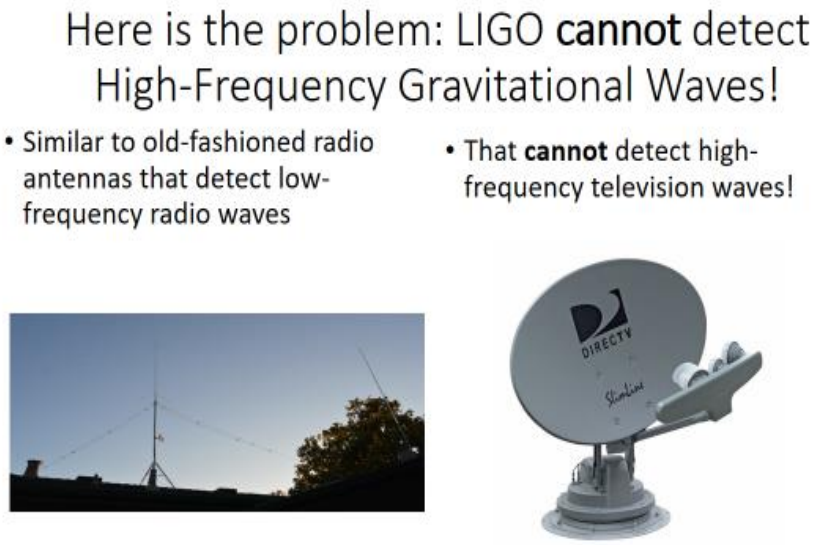
germ-line evolution

- D demise of the exoplanet's advanced civilization

Up to C our civilization would have survived about 2000 to 4000 generations. Assuming our civilization is about to evolve rapidly into advanced gene-engineered (germ-line evolution) or Artificial Education (see Chapter 9),or biological/electronic beings i.e., cyborgs, having a great artificial education, at C; it is estimated (or "conjectured") the longevity of our and other civilizations near us in our Galaxy to average about 400,000 years C to D. However, the demise of the advanced civilization might occur almost any time during the time interval between B and D. That is, during that time interval between B and D advanced civilizations could "blink" on at B and then off, that is reach its D as in the following diagram:

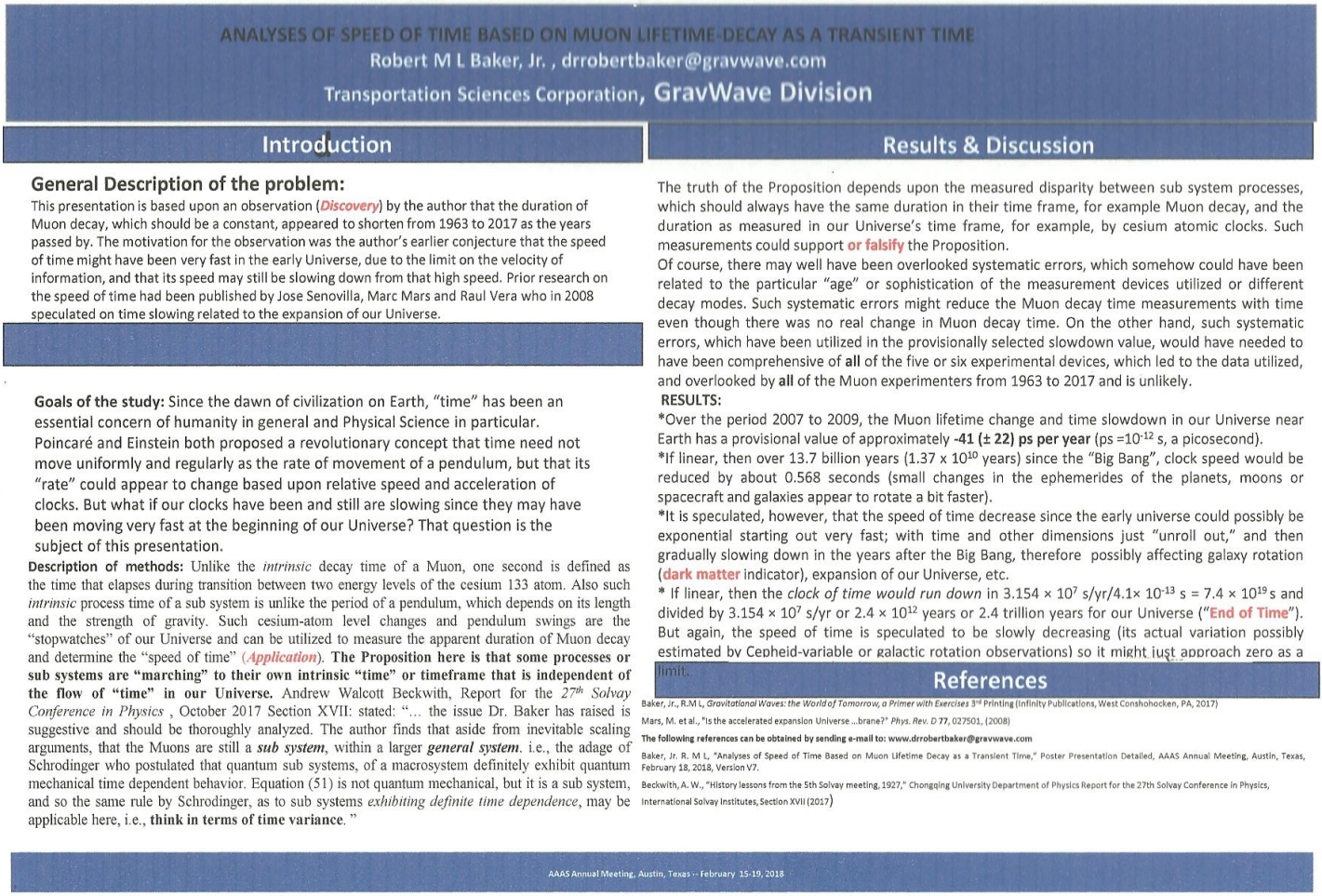


I emphasize that since High-Frequency Gravitational Waves (HFGWs) pass through all material, such as interstellar gases, galaxies, etc. without a being absorbed, HFGWs would be the obvious interstellar communications means of choice for interstellar communication!



At about this time in my research activities I was notified that the Annual Meeting of the *American Association for the Advancement of Science* (AAAS) was to be in Austin, Texas on February 15 -19, 2018 and after submitting an Abstract **I was invited to give a "Poster Presentation."** Such presentations involve a very brief spiel (about 5 minutes or less) plus the projection of a single slide (included below) – a real "quickie". I also noted that on Sunday,

February 18th Professor Chris Tully of *Princeton University*, Dr. Aron Chou Sr. of the *Fermi National Laboratory* and Dr. Kathryn Zurek of the *Laurence Berkeley National Laboratory* are presenting papers on the detection or actually lack of detection of Dark Matter. Fritz Zincky in 1933 proposed that in order to account for the higher rotational rate of galaxies, there must exist a "Dark Matter." Since that time the search for a sign or detection of Dark Matter has been fruitless. The research I was developing suggests that the reason Dark Matter has not been detected just may be because THAT IT DOES NOT EXIST**! As discussed in Chapter 9, the speed of time alone may result in the apparent higher rate of galaxy rotation billions of years ago (when the light left the galaxies), without need for Dark Matter!** And I believed a dialog on this suggestion and my supporting data was in order, so I accepted the Poster Invitation, and **it was also scheduled in the afternoon of February 18th the same day as the three dark-matter presentations so I invited all of them by email to attend my brief presentation – perfect**! Several AAAS scientists were present (some 9,000 in total attended the Annual Meeting) and there was a lively question and answer session after my brief spiel, but little to challenge my research conclusions. This is what my Poster projection slide looked like:



ANALYSES OF SPEED OF TIME BASED ON MUON LIFETIME-DECAY AS A TRANSIENT TIME

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Introduction

General Description of the problem:

This presentation is based upon an observation (*Discovery*) by the author that the duration of Muon decay, which should be a constant, appeared to shorten from 1963 to 2017 as the years passed by. The motivation for the observation was the author's earlier conjecture that the speed of time might have been very fast in the early Universe, due to the limit on the velocity of information, and that its speed may still be slowing down from that high speed. Prior research on the speed of time had been published by Jose Senovilla, Marc Mars and Raul Vera who in 2008 speculated on time slowing related to the expansion of our Universe.

Goals of the study: Since the dawn of civilization on Earth, "time" has been an essential concern of humanity in general and Physical Science in particular. Poincaré and Einstein both proposed a revolutionary concept that time need not move uniformly and regularly as the rate of movement of a pendulum, but that its "rate" could appear to change based upon relative speed and acceleration of clocks. But what if our clocks have been and still are slowing since they may have been moving very fast at the beginning of our Universe? That question is the subject of this presentation.

Description of methods: Unlike the *intrinsic* decay time of a Muon, one second is defined as the time that elapses during transition between two energy levels of the cesium 133 atom. Also such *intrinsic* process time of a sub system is unlike the period of a pendulum, which depends on its length and the strength of gravity. Such cesium-atom level changes and pendulum swings are the "stopwatches" of our Universe and can be utilized to measure the apparent duration of Muon decay and determine the "speed of time" (*Application*). **The Proposition here is that some processes or sub systems are "marching" to their own intrinsic "time" or timeframe that is independent of the flow of "time" in our Universe.** Andrew Walcott Beckwith, Report for the *27th Solvay Conference in Physics* , October 2017 Section XVII: stated: "… the issue Dr. Baker has raised is suggestive and should be thoroughly analyzed. The author finds that aside from inevitable scaling arguments, that the Muons are still a ***sub system***, within a larger ***general system***. i.e., the adage of Schrodinger who postulated that quantum sub systems, of a macrosystem definitely exhibit quantum mechanical time dependent behavior. Equation (51) is not quantum mechanical, but it is a sub system, and so the same rule by Schrodinger, as to sub systems *exhibiting definite time dependence*, may be applicable here, i.e., **think in terms of time variance**. "

Results & Discussion

The truth of the Proposition depends upon the measured disparity between sub system processes, which should always have the same duration in their time frame, for example Muon decay, and the duration as measured in our Universe's time frame, for example, by cesium atomic clocks. Such measurements could support **or falsify** the Proposition.

Of course, there may well have been overlooked systematic errors, which somehow could have been related to the particular "age" or sophistication of the measurement devices utilized or different decay modes. Such systematic errors might reduce the Muon decay time measurements with time even though there was no real change in Muon decay time. On the other hand, such systematic errors, which have been utilized in the provisionally selected slowdown value, would have needed to have been comprehensive of **all** of the five or six experimental devices, which led to the data utilized, and overlooked by **all** of the Muon experimenters from 1963 to 2017 and is unlikely.

RESULTS:

*Over the period 2007 to 2009, the Muon lifetime change and time slowdown in our Universe near Earth has a provisional value of approximately **-41 (± 22) ps per year** (ps =10^{-12} s, a picosecond).

*If linear, then over 13.7 billion years (1.37 x 10^{10} years) since the "Big Bang", clock speed would be reduced by about 0.568 seconds (small changes in the ephemerides of the planets, moons or spacecraft and galaxies appear to rotate a bit faster).

*It is speculated, however, that the speed of time decrease since the early universe could possibly be exponential starting out very fast; with time and other dimensions just "unroll out," and then gradually slowing down in the years after the Big Bang, therefore possibly affecting galaxy rotation (**dark matter** indicator), expansion of our Universe, etc.

* If linear, then the *clock of time would run down* in 3.154 × 10^7 s/yr/4.1× 10^{-13} s = 7.4 × 10^{19} s and divided by 3.154 × 10^7 s/yr or 2.4 × 10^{12} years or 2.4 trillion years for our Universe ("**End of Time**"). But again, the speed of time is speculated to be slowly decreasing (its actual variation possibly estimated by Cepheid-variable or galactic rotation observations) so it might just approach zero as a limit.

References

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The following references can be obtained by sending e-mail to: www.drrobertbaker@gravwave.com

Baker, Jr. R. M L, "Analyses of Speed of Time Based on Muon Lifetime Decay as a Transient Time," Poster Presentation Detailed, AAAS Annual Meeting, Austin, Texas, February 18, 2018, Version V7.

Beckwith, A. W., "History lessons from the 5th Solvay meeting, 1927," Chongqing University Department of Physics Report for the 27th Solvay Conference in Physics, International Solvay Institutes, Section XVII (2017)

AAAS Annual Meeting, Austin, Texas -- February 15-19, 2018

The next step is to publish my findings (beyond what I wrote in my textbook and spoke about in my *California-Club*, ERT, presentations) and seek comments of others. Easier said than done! An Editor of *SCIENCE* indicated my analysis was "… too speculative..." Of course, many new scientific theories are speculative. An Editor of *NATURE* thought the 33 ± 23 ps picoseconds change I found in more accurate Muon decay time differences "…is less than 2sigma (95% probability), and therefore not statistically significant." Of course, as Mark Twain pointed out: "There are lies, damn lies and statistics." Next, I submitted my paper to the *Journal of Space Science and Technology*. It required more than six months to attempt to convince three different referees that a review of the experimental data (shown in the Table above) showed a definite trend to shorter Muon decay time over the years and a consequence of this trend was that the speed of time was gradually slowing down in our Universe. Of course, the trend is only a *working hypothesis*. Furthermore, as so aptly remarked by Michael D. Gordin "… the absence of (precise) evidence of a Theory is **not** the evidence of the absence (or incorrectness) of the Theory, …" The

heat of Peer Review, prior to acceptance for publication (in this case due to the novelty of my concept, challenged by **three peer reviews**), tempers scientific papers **adding** to their strength – my paper on Muons and the Speed of Time was **accepted** for publication on my 88th Birthday! As I pointed out previously, that accepted paper was published in *Journal of Space Science and Technology* No. 3, August, 2019, and can be found by visiting: http://knit.mao.kiev.ua/en/archive/2019/3/05

Surprise!

In January of 2020, from *Fox News* - **Mysterious burst of gravitational waves hit Earth, baffling astronomers. Astronomers have no clue where it is from.** "A mysterious deep space event could have stretched and squeezed Earth last week (January 14th)." It was apparently caused by a black hole merger "… but (they) typically last longer (than 14 milliseconds) …" If the merger occurred a few billion light years away, when time was moving more rapidly, this might account for the observation and provide more **Observational evidence** for my *Rollout Theory of Our Universe!*

Cheerleader

Fred Hameetman emailed me on August 19, 2022, that "The Rollout Theory is gaining credibility!"

I replied: "You never know! Interest in and credibility of a theory could vanish in an instant!"

"Fred, you are the Cheerleader of my *Rollout Theory.*" As I wrote "…the Theory could come apart quickly, but it could never have come this far without your support!"

The summary of the *Rollout Theory* in Fred's email and its agreement with some new observation-analyses of the Webb Space Telescope, is as follows:

"The Alexandra Witze, *Webb Space Telescope* Article (*Nature*, **608**. August 4, 2022) involving interviews with many of the cosmologists mentioned, may include observational proof of the *Rollout Theory of Our Universe*. The *Theory* was attached and states that *time*, like the other three dimensions of spacetime, involves movement and the speed of that movement (please see second attachment). *Time* in the past, nearer to the beginning of our Universe, was moving faster than it is today. So, the galaxies APPEAR to rotate faster in the past than they do today, without need for dark matter to hold galaxies together. Also, the years appear

shorter and the age of our Universe much longer, so that star and galaxy formation appear more quickly. The dimensions of space also start off small and increase so the size of galaxies appear smaller near the beginning of our Universe and increases with time The speed of time is gradually decreasing as one moves away from the center of our Universe and toward our Solar System, therefore we might also see the gradually increasing redshift of stars without any need for them to be increasing their separation speed or accelerating and there might be no need for the invention of dark energy. Astronomers are essentially looking at a "movie" with a varying frame rate, much faster near the Universe's beginning and slowing nearer to our Earth. Very near the beginning of the Universe time is moving extremely fast so there is an *extreme red shift* to the microwave end of the spectra of the receding stars nearer to our Universe's beginning and could be the source of the Cosmic Microwave Background. If astronomers viewed instead a Physics laboratory, then the experiments would always yield the same result, but might APPEAR to move faster – technicians apparently running around and all experimental devices moving apparently fast, but with the same results for the technicians at the time. Therefore, the laws of Physics are invariant relative to the camera frame rate or the local speed of time in the *Rollout Theory*."

Fred and Joyce Hameetman

Conclusion of the Study of the Speed of Time

For the Process of muon decay the speed of time is found to decrease at the rate of between – 13 picoseconds, ps, per year and -3,521 ps/year at about the date 1981on Earth. For a galaxy, such as Messier 33, the speed of time appears there to be between -2.05 and -6.12 ps/year, However this difference in the speed of time may actually be caused by a very significant change in the observed emission spectra (visible and radio frequencies) at points in the galactic arms, themselves. If the spectra of stars at the periphery of a galaxy are miss associated with these galactic

stars, then because of their spectral change caused by a higher speed of time in the past, there would be an **overestimate of the rotational speed of a galaxy**! In fact, the observed galactic "velocity" curve of Messier 33 approaches the 150 km/s speed of the stars, further away in distance and time, **incorrectly associated** with that galaxy's stars. No dark matter need be assumed.

From the speed of separation of celestial object as our Universe progresses, we find that in the time between the observations of the speeds of the CMB and the Large Magellanic Cloud Cepheid's of approximately thirteen billion year, there is a speed of time change of 3.15×10^8 ps/year. As pointed out in in "Detection and Determination of the Variation of the Speed of Time," by Robert M L Baker, Jr., Bonnie Sue Baker and Fangyu Li, *Journal of Modern Physics* Vol.**12**, No. 6, May, 2021 (see end of Appendix II for the actual article), this calculation is in keeping with the theorized much higher speed of time in the past, near the beginning of our Universe, predicted by my Theory of our Universe. In addition, due the slower speed of time in our current observations of the CMB, which is closer to the beginning of our Universe, and the Large Magellanic Cloud Cepheid speed observations, there is no acceleration of the speeds of these celestial objects' speed of separation. Those separation speeds are decreasing as predicted by gravity and **dark energy is not required**! As previously noted in this Chapter the CMB represents an "**extreme *red shift***"! It is caused by the much **higher speed of time** and APPARENT **much higher separation speed of stars** as we begin to view the **beginning** of our Universe, ***specifically as the Cosmic Microwave Background is observed by radio telescopes.***

To establish a Theory for the origin of the change in the speed of time we conclude that HFGW detection is required to understand the activity and processes at a nanosecond or less near the beginning of our Universe. Finally, we concluded with a discussion of processes like Muon decay or possibly like bosons decaying into matter, which operate with a "different clock" a clock that does not participate in the variation in the speed of time in the rest of our Universe does. We call these Processes Non-Varying Rate of Time or NVRT processes.

The Equation for Success

In April, 1921, about 20,000 people showed up at New York Harbor to greet Claim Weizmann, the President of the *International Zionist Organization*. Although celebrated in academic circles, but almost unknown to most Americans was another passenger, Albert Einstein. A news reporter mistakenly thought the crowd was there

to greet Einstein, and Einstein instantly became front-page news! In another case, due the publicity afforded Manfred von Richthofen – the famous "Red Baron" (you know, portrayed as Snoopy the WWI Fighter-plane Dog pilot in Charles Schultz's *Peanut* comic strip) was considered the ace-of-aces of the war, being officially credited with **80** air combat victories. But who has ever heard of Erich Hartmann who became Germany's top ace in just three short years with more than **350** aerial victories? His killing streak remains the deadliest in history! These cases are cited in Barabasi's Book on the formula for success (2018). I distil his formula into the following Equation:

$$\mathbf{S = G \times N}$$

Where **S** stands for Success, **G** is how good the idea is or its great numerical value and **N** is the number of individuals that learn or know about **G.** For Einstein both **G** and especially **N** were large, whereas for Hartmann **N** was much smaller and **G** much larger than they were for the "Red Baron."! The net effect of the resulting large **S** was the success of "Snoopy".

Professor Andy Beckwith and Mounir Belgacem come to the Rescue!

Andrew W. Beckwith **Mounir Belgacem**

I believe that my new Rollout Theory of Our Universe is a good idea, that is, I believe **G** is big. On the other hand, **N** may be quite small! So, what do I do to get the word out? To the rescue immediately comes Andy Beckwith. He is an internationally renowned expert in cosmology, (the science of the origin and development of the universe) and has often supported my scientific activities. He selected me as coauthor of a paper entitled "Value of High-Frequency Relic Gravitational Wave (HFRGW) Detection to Astrophysics and Fabrication and Utilization of the Li-Baker HFRGW Detector" and allowed me to include a detailed exposition of my new, Rollout Theory of Our Universe! After a serious peer review that paper, was

accepted for publication in the *Journal of High Energy Physics, Gravitation and Cosmology*, Volume **6**, No. 1, January 2020.
Next to come to the rescue is a valued international scientific supporter of mine, Mounir Belgacem. He organized a "First International Meeting on Universes and Gravitational Exobiology" in Paris that highlighted my new Theory. Both upped my **N**!

Late in 1990 I was working on a huge flywheel to store energy for a wind energy farm of a good friend, Fred Nobel. In our "giant flywheel" Patent I decided to memorialize my ideas on the beginning of our Universe and other universes. My flywheel rotated so it could generate gravitational waves -- although of trivially small amplitude it was a wedge to involve Physics and Cosmology in the Patent's description! My universe ideas were included in United States Patent Number 6,160,336, R. M L Baker, Jr. & F. W. Noble, filed November 19, 1999, and granted December 12, 2000; specifically, my ideas were in the Section on **Spacetimeuniverse Geometry:**

Maybe time had a "speed", Bonnie and I had conjectured, as it rapidly rolled out. But is there a way to measure it? Possibly, there was some process or effect that "operated" on its "own" time I thought. But what kind of a – "process"? OK there were subatomic processes that involved some uncertainty, some "quantum-mechanical" processes. As already mentioned, and to make a long story short, after a lot of review Bonnie and I had decided the process of Muon decay might be a good choice since our studies revealed that is duration was a NVRT process since its decay time appeared to change relative to "our Earth/laboratory time."

Bonnie and I wrote a joint paper (*Journal of Applied Mathematics and Physics*, 2016, 4, No. 1, 110-129. Published Online January 26, 2016 to be found at http://www.drrobertbaker.com/docs/JAMP%20v7-1720448%20.pdf entitled "Application of High-Frequency Gravitational Waves to the Cataclysmic Event of Our First Encounter with Intelligent Extraterrestrial Beings"). In early 2017 I gave a talk on my research to the Economic Round Table (ERT) at a breakfast meeting at the California Club in Los Angeles. We followed it up with paper. that was based on a lecture that we both developed and was entitled "High-Frequency Gravitational Wave Research and Application to Exoplanet Studies," but I alone presented it to the *Main Astronomical Observatory of the National Academy of Sciences of Ukraine* in Kiev on April 17, 2017 (it was published in the *Space Science and Technology Journal* **23**, No. 3, pp.47-63, doi: https://doi.org/ UDC 530.12:531.51). In footnote

5, page 54 of that publication was presented our *first discussion* of the speed of time and Muon decay!

Our ideas were coming fast and furious now. A second paper was published in the same Journal: "A Working Hypothesis on the Muon-Decay Time Shortening and Time" (*Journal of Space Science and Technology* Volume 25, No. 3, August 2019). Next, I got together with my pal, Andy Beckwith, to publish Beckwith, A. W., Baker, R. M L, Jr., 2020, "Value of High-Frequency Relic Gravitational Wave (HFRGW) Detection to Astrophysics and Fabrication and Utilization of the Li-Baker HFRGW Detector," *Journal of High Energy Physics, Gravitation and Cosmology*, **6,** 103-122.As noted, I hoped to increase my **N**!

***"The Grapes of Wrath"* (John Steinbeck, 1939)**

Is there a better way to harvest grapes? I wondered. I was initially interested in vineyards and grape harvesting back at UCLA in the 1950s. A friend of mine, Carl Doumani, was quite the entrepreneur, even at UCLA (bought a beer "joint" *Dudes* in Westwood Village – one "door" from the *UCLA gates*!) and after graduation purchased "*Stages' Leap*" winery in NAPA, California. In fact, he became a "Legend" among the vineyard owners in NAPA. I often thought of Carl's success and grape harvesting over the years. I was especially intrigued by a novel grape harvesting machine that did not require workers to actually "pick" off bunches of grapes, but to "shake" them off. Then one day I was with Skip (Harold) Bowling at his beach home in Rosarito Beach where he demonstrated a little unmanned model *quadcopter*. Very impressive and maybe such an airborne platform could shake loose and harvest grapes **from above!**

Specifically, there is considerable prior art concerning grape harvesting machines including U.S. Patent 3,328,944, which involves motor propelled ground moving machines and hands-on human operators, exhibiting weights of several hundred pounds. Prior art involves only land locomotion and direct human control of the grape harvesting machines and grape collection using humans and/or human operated devices. My patent search revealed that there is no prior art concerning grape harvesting machines that have airborne locomotion that are controlled remotely by computer-controlled means and support grape-harvesting devices with weight in the appropriate 200 to 400 pound range . Furthermore, there is no prior art on systems of unmanned aircraft propelled sled grape collection devices working in concert with unmanned aircraft integrated with grape harvesting machines, which are controlled remotely by advanced artificial-intelligence computer systems. So, on my 90th Birthday, September1st, 2020 the US Patent Office **accepted** my Provisional

Patent (**US Provisional Patent 63/072,992, "Airborne Conveyance Operatively connected to a Fruit-Collection System").**

SUMMARY OF THE INVENTION

The airborne conveyance or harvester flies along a row or rows of grapes, and straddles a given row with flexible fiberglass rods, like a rib cage. As the airborne conveyance flies down a row, rods hanging below gently shake back and forth. They are adjusted so that they firmly hold onto each vine for an instant as the airborne conveyance passes over the plants. The shaking motion is tuned to a particular frequency, typically between 480 and 560 beats per minute. This movement of the vine causes the berries to fall off the stem, leaving the stem attached to the vine. The mechanical process is from above and it involves no cutting, just a lot of shaking. If the grapes are ripe, and near to falling off the vine, then it doesn't take a lot of shaking to break the individual grapes from each vine. The grapes fall to the sides of the machine onto two sleds on each side of a row or rows. Two airborne conveyances controlled remotely moving on parallel trajectories pull them to the end of a long row where the airborne conveyances upend the slays, sleds or flat cars and discharges the grapes into bins at the ends of the rows and they are subsequently transported to the winery. Along the way, there are a few high-speed fans that remove leaves and other debris that may have fallen from the vines along with the fruit. The airborne conveyance is connected to a system of sensors to ascertain the condition of the fruit that might be collected. Multispectral video camera data can be processed, for example, by an Enhanced Vegetation Index computer algorithm to manage the vigor of the grapes.

***"Happy Days"* (Norman Gimbel, very famous lyricist)**

It was back in 2002 at dinner with my daughter, Robin, my son-in-law, Bob Fell, Bonnie, Norman Gimbel, and his daughter, when I asked Norman: "How exactly did you start to compose a song?" To my surprise he said, "When the phone rings" For example, a call from a producer of "Happy Days" phoned him and ask him to write a new song for the Series (to replace "Rock-around the Clock"). That started him off! New scientific theories or ideas are often germinated by events. In Bonnie's and my case, it was by an email from Nagib Callaos, (on October 15th, 2020) Editor in Chief of the *Journal of Systemics, Cybernetics, and Informatics,* He was looking for papers for a *Special Issue* on "Rigor and Inter-Disciplinary Communication." Bonnie and I had jointly drafted a previous paper for that Journal and Bonnie commented "Bob you have studied the osculation point or frontier of our Universe

with other multiverses. In fact, yon used an analogy of a 'Horse Race' to explain possible connections between universes. Why not use that interface for some type of multiverse intercommunication?" Guess what? We **did** coauthor it: http://www.drrobertbaker.com/docs/Intercomunications,%20from%20HFGWs%20to%20Multiuniverses.pdf (as usual, CTRL – click).Allow me to quote from section **5**. Of that article:

"5. Multiuniverse Communication ("fun") This Section **5** is more than a working hypothesis, this Section is pure speculation! Why do scientists work on 'things? We answer: '… mainly for fun.' We say 'mainly' since we scientists, like other life forms, must follow the dictum: 'Survival of the fittest!' For example, fun-loving nuclear physicists had to earn a 'living' and at one time needed to survive Hitler. In this latter case 'for survival' they turned for a while to the very practical and painstaking development of the Atomic Bomb. Therefore, let's now have some fun and consider here Multiuniverse or multiverse communication."

I do not know many Philosophers!

As a matter of fact, I only really know one – Professor Jeremy Horne: Who holds a Ph.D. in Philosophy from Florida State University (1988) in logic, the history of philosophy & philosophy of Science (as I recall). Professor Horne was kind enough to submit the following Peer Review comment:

"The Bakers (Robert and Bonnie) are working on seminal research, not simply because of the mechanical aspects of cosmological physics but the philosophy underpinning it, this time concerning 'interdisciplinary'. Their keen realization of context and its foundation - origins - is reflected by going back in two ways: cosmological origin and the smallest of the smallest, Planck length and time. Philosophers also know context and history in terms of 'becoming', something subsuming its past, a requirement for our understanding of that something. Of note is their looking to 'building blocks', like time and space to suggest a gateway to a more expansive 'interdisciplinary', the intercommunication with another universe or even dimension. No doubt they are appreciative of Edwin Abbott's Flatland, A romance of many dimensions. Indeed, their entertaining the changeability of dimensions may be a solution to the Abbot problem. Real philosophy, indeed! As I was going through their abstract for the last time from an editorial/proofreading standpoint, my eyes landed on 'our Universe', wondering if 'universe' should be capitalized. Is it a proper noun? Personally, I see it equivalent to 'Earth', a special entity, i.e., a particular thing, a proper noun, going even further and arguably more

radical, an organic entity, perhaps conscious. NASA does not seem to like this idea, saying not to use the upper-case style. I came across a National Public Radio (NPR) article describing the universe in which we live as ‘the Universe’, ours being, perhaps one among many. In the article, we also see, ‘our Universe", just like the Bakers. You see, already we are caught in a debate about meaning at the Meta and object-level of discussion about ‘universe’ or ‘Universe’. Do we capitalize ‘universe’? Do we capitalize ‘Universe’? I am going to pass on this one, allowing the Bakers' deep philosophy to unfold before us. As an aside, we should note the many decades of Bob Baker working with NASA in training astronauts and his authorship of numerous Astrodynamics books. It is wonderful that the Bakers are willing to tackle the fundamentals of our existence by looking to the *Queen of sciences*, *Philosophy*, a task insurmountable to most researchers. One should be reminded of ancients contemplating in the same way the Bakers are, Plato's Time as an example. Admittedly, as a philosopher-scientist, I am advertising for my discipline, but I see the Bakers in the fine company of the natural philosophers like Newton, Leibniz, and Descartes. Perhaps no final answers will come with this paper, but to arrive at the truth, you need to take the right road, the Bakers having identified it.”

What will people look like in a billion years from now or, of even more interest, what will any life forms in our Universe look like several billion years from now?

So, Bonnie and I decided to imagine and then write a scientific paper on the subject to be published in the *Journal of Modern Physics.* Here we are imagining together:

Bonnie and Bob *imagining* in 2021, a year before publishing. Bob was 91 and Bonnie was … well just guess?

Our paper: "EVOLUTION OF LIFE-FORMS IN OUR UNIVERSE"

Journal of Modern Physics,Vol.13 , No.1, January 2022

As we commence writing our "imaginings" (first draft of ideas for the paper) down, we realized we needed to broaden our Author team by including a brilliant MD and PhD Jeanne Hall, she was also the daughter of a university pal of Dr. Baker's at UCLA, Jerry Hall.

CHAPTER 13 *Odds and Ends*

####

Sometimes you don't see a 13th floor, even more rarely a 13th Street, here is a 13th Chapter; but why is the number 13 considered unlucky?

"From the 1890s, several English language sources relate the "unlucky" thirteen to an idea that at the *Last Supper*, Judas, the disciple who betrayed Jesus, was the 13th to sit at the table."

Don't you just love Google?!

####

"FOR THE GRANDKIDS"

I realize that I have not really fulfilled that *Promise* made at the outset of this Tome. Allow me to now add a couple of *Hints* directly for my Grandkids:

1. *It is far better to try and fail than to never try at all*

However, you must realize that you may not be the only one to suffer from your failure. Later on you will read that I failed to vigorously promote some of my ideas such as my giant fly wheel, energy-storage device, for Fred Noble's big energy windmill-turbine farms or my high-frequency gravitational-wave (HFGW) generator for Fangyu Li's Chongqing-University gravitational-wave program. Thus one may also suffer from another of my hints:

2. *If at first you try and fail, then try, try again – never ever give up!*
3. *Seek a "guiding star" for your most important endeavors.*

If you have an important endeavor, then it is important to seek out an individual who plays a significant role in that endeavor to provide a "helping hand" or I term

it a “guiding star”. Here are a few examples out of my life to give you an idea of my meaning.

Endeavor: Astrodynamics, theoretical, practical applications and educational

Guiding Star: Professor Samuel Herrick of UCLA

Endeavor: West Coast University, as a Trustee and eventually President

Guiding Star: Fred Nason Senior of Beverly Hills Transfer and Storage

Endeavor: High-Frequency Gravitational Waves

Guiding Stars: Paul Murad and Fangyu Li, Chairman Physics Department, Chongqing University, China

Endeavor: Life

Guiding Star: Bonnie Baker partner and Wife

A VERY BEAUTIFUL SOUL

Having read at least some of this Tome you must realize how beautiful I realize my Bonnie is physically, but also you should understand that she is a **Very Beautiful Soul**! As an example, I will relate one example from her realtor work here in Palm Desert: A couple asked Bonnie to search for a house they could buy here. The pair had always lived in a Trailer now and it would be their firs actual *home*! The wife was a night watchman and supported her invalid husband who suffered from diabetes - often had bloody eyes and could not work. Her Grandmother had just given her a little money to help them purchase their first real home. Well, Bonnie took a liking to the pair – felt sorry for them. As a bystander, I had witnessed Bonnie’s dedicated work ethic on many occasions, but this was different. She tirelessly worked week after week to find and then set up purchase of their *dream home*– whatever commission she might receive on managing the transaction would never even come close to sufficiently compensate Bonnie for her time! After almost two and a half months (her transitions unusually take about one month to complete) the couple were in their Happy Home. Below please find a letter sent from a *Home-Loan Consultant*

concerning Bonnie's effort that documents just one of Bonnie's many magnanimous activities!

"Hello Tom,

"As a Home Loan Consultant with over 30 years' experience here in the desert, I wanted to take the time to let you know how impressed I was by Bonnie Baker. We shared a mutual client who was extremely difficult to work with. This customer is uncomfortable with technology and would not use doc-u-sign or email as part of the transaction. She was hard to reach and would not return phone calls for days, making it impossible to meet contingency periods per the contract. Bonnie was so patient and jumped through hoops to assist, even when the customer was not always pleasant.

"This client cancelled two purchase transactions at the last minute. After the first cancellation, most agents would move on but even in this high-pressure market, Bonnie continued to put 100% effort into finding the perfect home for this customer. Bonnie's work ethics and perseverance paid off and she finally closed a purchase transaction with the customer. Coldwell Banker is very fortunate to have Bonnie as part of the team. —I plan on adding Bonnie to my list of referral partners when asked to recommend a local agent to Wells Fargo customers. She is dedicated, hardworking and a pleasure to work with."

Sincerely,

Lisa Galdin,

Wells Fargo, La Quinta, California"

FUNNY

In the 1960 s or 1970s, Bonnie and I together with, as I recall, Jim and Cathy Jetton, attended a burlesque show in Hollywood, called "The Blackouts". Essentially, they

turned off the house lights and dropped the curtains between scenes. We had purchased seats on the front row of the Theater. After one scene I excused my self to attend the Men's Room. On my return I saw the "Stage Door". I thought: "Why not go in there?" On the stage now, (curtain was down} I saw the bed where a burlesque actress performed. So, I jumped in between the sheets. Just then the "Burlesque Queen" came on stage. She gasped when she saw me in her bed as did Bonnie and the Jettons. I was removed from the bed by some rather rough stagehands. We enjoyed the show, but just prior to the concluding scene the actress was in a bubble bath. Apparently filled her mouth with some of its contents. She exited the stage, walked down the front row of the Theater, and treated me to a mouthful of suds all over my clothes! Punishments fits the crime you know!

A MEDICAL MOMENT

A few months after I turned 91 years of age, I began to feel a bit, shall we say, "foggy" and "off balance.". I attributed my condition to "Old Age". My situation deteriorated and had some difficulty walking. So, I decided to go to Eisenhower medical campus in Palm Desert, California for a complete, all-day Physical Exam including Brain Scan. Reminds me of a story I often talked about Bonnie Baker. Bonnie is a bit of a hypochondriac and I tell people: "When she has a headache most people have two aspirin, but Bonnie has a Brain Scan!" Anyway, Eisenhower medical gives me a complete all-day medical exam AND a Brain Scan. At the end of my Physical I get my Brain Scan I inquired as to the results, and they tell me that they found "nothing." No, that was not that they found *I had no brain at all*, (a very serious problem I suppose) but because they found **no brain damage**! However, they did I find that I was severally dehydrated and had a urinary tract infection, which may have caused the dehydration. Some antibiotics fixed the infection and I was given 100 ccs of water "to drink immediately."

A day or two later I was being extremely frustrated working on my computer (as related previously I flunked typing twice in High school and once at UCLA and typing (actually "hunt and pecking") on my computer was a challenge). BUT suddenly, like a curtain coming down, a "Brain Fog" appeared, an hour later that brain fog came back far denser than before. I turned to Bonnie and exclaimed: "I have suddenly become dumb!!" Sure enough, after Bonnie asked, I could **not** count backward from 100! I also could not walk a at all– I told people that "my Gyroscope was now missing" since there was no physical damage to me – my problem was in

my head! Also, I started urinating 10 to 12 times a night. That problem was solved by taking FLOWMAX (MSULOSIN 0.4 MG HCL) every night (always take it exactly at the same time each night). Bonnie's research revealed that having Brain Fog after an infection was rather common for people (especially, females) in their early 90s.

I now felt it was time to seek special expert advice. So, my family lady physician at Eisenhower Hospital campus, Dr, Mei Lai on April 18, 2022 arranged an evaluation of my condition by a neurologist Dr. John Robinson also at the Eisenhower Hospital Campus (his Office next to her Office). He prescribed DONEPEZIL HCL 5 mg also at bedtime as well as NAMENDA 5 mg twice a day--I am awaiting results.

During his evaluation, Dr Robinson express a great interest in Physics, and I emailed him a copy of my Rollout Theory of Our Universe. As an expert in the human brain, I wonder what he would think of my far-out theory of the evolution of the life forms in our Universe.

A WONDERFUL EASTER MEMORY 2022!

In the early Easter evening, 2022, shortly after sunset: Bonnie, Robin, Grandson Alexander, and I were sitting around in our outside veranda in Palm Desert, when Alexander broke out in song (he has a beautiful operatic voice – sang, as I already related, in Carnage Hall) -- first, Alexander sang Frank Sinatra's "Luck, Be A Lady, Tonight," (written by Frank Loesser in 1950). After a couple of hours in song, Alexander asked Bonnie to dance and Robin asked me –then we chatter on and on that night about our "life together" -- what a fabulous evening. Bonnie and I will never ever forget it!

A TEMPORARY NEW DAWN

A few days after starting the pills Bonnie was watching me and I was walking perfectly, just like before the Brain Fog descended! I was walking just like I had been during my last 80 years! I apparently did not then have the Brain Fog! Somehow, I had "forgotten it". It was a temporary "dawn" however but gave me hope. It had been suggested that while "fogged in" I take proper walking lessons. I hated the "training sessions" requiring driving over to the Eisenhower Hospital several times. To me it was like having just broken your leg and taking lessons on how to walk properly walk with a broken leg. NO! Just concentrate on FIXING THE BROKEN LEG!!

THREE LITTLE WORDS:

What are the most important three little words in the English language? **I Love You!** No! They are: **Can I help!** Obviously, when someone has an accident we say "**Can I help!**" But when some spills something and makes a mess, we often might exclaim "Why aren't you more careful!" When someone runs into and breaks your favorite piece of art you often might exclaim "You stupid jerk look what you have done!" When someone leaves a Refrigerator door open or does not turn off the light when they leave a room we often may exclaim: "What's wrong with you? You lazy jerk!" When someone messes up some important document you often might exclaim "Why did you make that stupid mistake!" When someone UNINTENTIONALLY commits an error or has a problem that causes you difficulty – just say "**Can I help!**" You would be surprised how helpful and meaningful those three little words are!

Speaking of little words, remember the old song: "Home, Home on the range … where seldom is heard A discouraging word …" (Roy Rogers). Do not use **discouraging** words or criticize people you care for in a critical tone – Never, **never**! Another **Golden Rule.**

One day I was assembling something (Hateful job, why can't things come fully assembled!). Bonnie said "Why don't you read the Instructions first? None of you scientists read instructions! Why?" Well, I said, "If God wanted scientists to tread instruction, then he would carve Newton's Laws in stone somewhere!"

EXERCISE:

First of all **I HATE EXERCISE!** On the other hand, I know it is important for my health and brain (SCIENCE July 10, 2020, **369**, pp. 167-173). At about 60 I decided to commence a morning exercise activity. Since Bonnie and I were traveling a lot and I could never be sure of the existence of a convenient Gym, I wanted exercise that could be accomplished without the need for equipment. At UCLA in the Phi Psi fraternity, I led the new pledges in exercise consisting of 50 pushups with my fingers extended. After about a week of "adjustment" I was able to recreate that capability, but only with "little" pushups not all-the-way up and down and NOT touching your chest the floor! I decided to start my exercise out by three sets of 20 leg lifts and associated "crunches" with my shoes on. (I must add that I had femur spine problem once and the therapist insisted that I raise one leg at a time – not both together!) I was worried about osteoporosis, so I followed those three sets by lying flat (pushing my body and head hard against the floor for 30 seconds – at 92 it hurt my neck a bit to get my head flat) next came the 50 pushups. After the pushups, I tucked my left

knee vertically under my left hand and then stood up by pushing hard on my left knee with my left hand! I had read a scientific article about how to retain balance and exercise your knees. It consistent of sitting in a low chair and standing up ten times while keeping your arms folded (so as not to depend on your arms for help). On long flights to overseas destinations, I could even do my exercises in the aircraft's isle!

Now here is the beauty of this exercise regime: **you can adjust its rigor as your age increases and your strength naturally diminishes and keep the same number of moves!!** For me (and is different for others) as I passed 70, I used my extended fingers during pushups to just 25 of the 50 pushups, then 50 pushups without figure extension. In my 80s, as I approached 90, I utilized a piece of furniture to rest my right hand to stand up. In my 90s I took off my shoes for leg lifts, and then used a higher chair for my stand ups – still the same number of exercises! Nevertheless, at 89 I started to use a cane, then a walker – too much trouble, so just stuck a cane under my right arm for a sense of security from falling. And walking: try always "Marching". It is the most efficient means of leg locomotion. For centuries if not thousands of years armies have used it to "move people." Also slightly swinging your left arm helps balance and stepping each pace reduces shoe/boot wear and tear! Singing, whistling, humming or just thinking a marching song keeps up your pace

By the way, I read somewhere that it is valuable for your brain to use your left hand as often as you can. Also, when you feel that your exercise is more of a punishment, and you want avoid them – do not quit! Simply reduce the number of repetitions or their intensity (as I did with pushups). By the way, there once was an exercise enthusiast, Jack Lalanne, who believed he could keep up his exercise regimen, including, for example, swimming while pulling a power boat, for the rest of his life! At 75 years of age Jack was unable to do that and discovered a simple fact that you can tolerate increase in muscle exercise, but as you age your muscles just become less strong no matter what you do, and you must cut back!

My right leg began to hurt so much I could barely walk! BUT it was NOT my leg! No, it was a big problem with my spine – the L3 or L4 or something. So, I am now in the midst of having spinal injections and a *femoral nerve block*. But I decided not to wait – you must take charge of yourself!! No matter the pain you must fight on!! I started my exercises again (they were interrupted for a few weeks due to my leg pain). I could only do them partially. My 20 leg lifts were only possible one leg at a time and were reduced to ten or so. It reminded me of training at *Harvard (military)*

High School, when I was preparing for the 880 yard (half mile) run. I would throw up at the end of every race! Anyway, I was somehow in the finals of the local CIF (California Interscholastic Federation governing high-school sports in California) 880 race. There were eight of us from various high schools competing. Off were went! As I rounded the track first one competitor tripped and was eliminated, then two more apparently had shin splint injuries and dropped out. Then a fourth contestant fouled out and now we were just FOUR! So, I wound up a very distant fourth and I even received a medal -- gold, silver, bronze and COPPER for me! It was absolutely the only athletic award I ever received (my kids and grandkids had dozens of **FIRST**-PLACE awards) Guess what? My Mother LOST my one glorious athletic award! As the French say ***C'est la vie!***

The lazy painter*:*

"What are you doing there in your studio again?!"

"Well, I am painting a picture;"

"You are very messy! You splatter paint all over, stand closer to the canvas! You walk through clean floors and dirty them with your dirty shoes – you must take your shoes off before coming in! Do you realize the porch needs washing and I have been working all day cleaning our house, especially the windows!?! What is your excuse – that all males are messy? We must get rid of that awful trait by germ-line evolution! What is wrong with you?"

"Please Don't Criticize! I think I am painting a very pretty painting and I enjoy doing it!"

"Have you sold any of those pictures lately – we need money you know!"

"No, I did sell them for a good price in the past, but not today -- someday people will enjoy my paintings, learn from them and even buy them again-- so stop criticizing me!"

"Well, that is in the future, and this is now -- and I would like help cleaning our house and the porch needs scrubbing! You are sloppy, messy and don't tuck your shirt in, even my sister had to discipline you for leaving the icebox door open again. You don't accept criticism and are sometimes rude and unable to do simple things

like attach your canvasses to your easel and carry your paintings around! Why don't you get a paying job in a High School teaching Art?"

"I love you very much, but I am not good at cleaning the house and at my age scrubbing the porch or vacuuming can hurt my back! In the past I had people to attach my canvasses to their frames, set up my easel and carry my paintings around – specialists for those tasks – but no longer! Unfortunately, I am too old to accomplish those routine tasks now! I cannot take criticism well when it becomes so constant that hurts me! On the other hand, for the last three months two artists have encouraged me and simply *suggested* improvements in my sketches, and I changed them. But I guess I was just born sloppy, forgetful, unable to do things others had always done for me and probably it gets worse with age – It's easy to correct my sketches, but almost impossible to fix flaws in my character. So please stop the criticizing. I mean no harm and I am far too aged to be re-educated!

"Ridiculous! – You are simply lazy, selfish, sloppy and do not want to pitch in and help us! You drink way too much and sometimes fall! Also, you are far too sensitive to criticism and get angry about my disciplining you. By the way, you have very few male friends! Why aren't you out with the *Barcelona Boys* at the Pub who are chatting and throwing darts – everyone else at your age is doing it in Barcelona -- or they may be home helping their wives – or might even be making money for them?"

"OK, you may be correct, but I don't think that the other fellows have a talent for painting pictures like I have, and I believe that I do have talent and my pictures may have value in future -- possibly millions of children and others someday may learn from and enjoy my pictures. I only pray you would lay off my character flaws – I was born sloppy, selfish, and messy, I like martinis, stumble when I walk, and those flaws get worse with age – can't help it! Please STOP criticizing me!!! **STOP!** Also, we humans, especially old, male ones like I am, often react negatively to the continued drumbeat of criticism – it physically hurts us—!!!"

"No! You are lazy, selfish, and sloppy, drink too much and are sometimes rude and no one is going to profit by your work Picasso!"

MORAL OF THE STORY:

CRITICISM does **not** educate

CRITICISM usually does **not** motivate

CRICISISM **always** irritates

CRITICISM sometimes intimidates (bullying, bitching and insulting)

CRITICISM is corrosive and eats away at a relationship

It is often far better to "recommend" or "suggest" or "propose" a course of action rather than CRITICIZE!

Remember: "**A critical tone, even on the phone, will chill you to the bone!"**

A wife who continuously criticizes her husband is often called "*henpecking*" her husband and nearly drives him crazy! On the other hand, a very naturally sloppy and messy man nearly drives his wife crazy!

During my about 40 years in Education, I never *criticized* a student. If they performed poorly, it was either that I had not been clear enough in my instruction, that innocent mistakes were made or that their intellectual level or preparation capability in this Course was insufficient.

On the other hand, my Drill Instructor during my Air Force Basic Training did a good job in motivating me to march straight by employing **lots** of verbal criticism! Also bringing up children is a bit like Basic Training: "Spare the rod and spoil the child!"

ANOTHER MORAL OF THE STORY:

As Shakespeare suggested "Jack of all trades and master of none." It is unnecessary for the painter to know exactly how to cement the canvass to a picture frame or how to fabricate and repair an easel. Just as Walt Disney, Daryl Zanuck and Donald Douglas emphasized during our several chats: YOU MUST LEARN TO **DELEGATE!** Certainly, the painter need not know the details of the proper canvas cement to use! As Clint Eastwood's character, Callahan, stated in *Dirty Harry Magnum: Force*: *"*A man must know his limitation!" Each of us has a "specialty" some general, some specific-- each has value, but one must also recognize their limitations. In any event, extraneous tasks remove time from a painter's most valuable pursuit: his talent to paint a beautiful picture!

By the way, Clint Eastwood, my childhood friend, R J Wagner and my adult pal, Buzz Aldrin, like me were all born in 1930: Eastwood (May 31st), R J (February 10th) and Buzz (January 20th). Each of us apparently enjoy the long-life gene and we all are "depression babies."

YET AOTHER TAKEAWAY FROM THE STORY:

Aging can be difficult. Dexterity, balance, and strength seem to dissipate and back pains enter the picture. Routine tasks such as cleaning paint brushes, trying to type, or to file/find documents, etc. become more challenging as we age especially since the *Assistants* who previously accomplished those routine tasks for us a may no longer be available. A fumbled brush dropped to the floor may hurt you back to retrieve. Paint may be unintentionally dripped and mess up your easel or worse yet mess up the floor! Often it is difficult to wiggle up closer to an easel or a table in order not to broadcast litter and enrage others who might need to clean our surroundings and discipline our conduct! Yes "maturing" can be rewarding or downright irritating to others and as the song goes "Cleaning Up a mess we created is Hard to DO!" or was it "Breaking Up is hard to do"? (Neil Sedaka & Howard Greenfield, 1962, 1974)?

HERE IS ANOTHER LITTLE STORY:

The lazy caveman:

"There once was a lazy caveman. Unlike the others he did not hunt for food. Instead, his hobby was to look for strange things such as:

"He saw some lightning start a fire and then he struck a flint stone and sparks flew – maybe a way for humans to start a fire he wondered? Then he watched a rock roll down a hill. Maybe a round rock shaped like a disk might be useful he wondered? Then he laid back and looked up at the Moon and the stars – and he wondered.

"No one in his cave appreciated him or his hobbies– He did **not** bring in any food to his cave for all to eat!"

MORAL OF THE STORY:

Invite a scientist into your cave!

HINTS

Hint for Happiness: As I have already suggested and must emphasize again, I believe there is only one luck in life – mainly, if you work your butt off you will do well – without "luck." But choosing a spouse – wow you can't check every

girl/boy out in the world and choose – of course not. Even if you could since we all go through "passages" in life we may not go through them together with your marriage partner – double luck! Bonnie and first day you met – how nice and thoughtful you were to impress one another. And then at days end to just talk, about the day, the future or reminisce about the wonderful times you enjoyed together. That is the best equation for happiness, and I recommend it highly!

Hint for "To Do" List: Each morning I look at my list of tasks I might do today. I go over them and contemplate which ones I really would enjoy doing and which ones I would rather put off and do tomorrow or another day. These latter tasks, which I would rather not do today, BECOME MY VERY FIRST PRIORITY! The likable tasks become like "Desert."

Hint from Ralph Waldo Emerson again: Paraphrasing him: "The foolish adherence to the urge to always utilize the newest, most effective technology is the Hobgoblin of little minds."

Hint for all "Voids": All voids fill up with … well, "pu-pu": If a question remains unanswered, then the worst possible answer will be assumed. Any lack of information will be replaced by misinformation. All unaccomplished action will result in the most horrible possible action. Nature abhors a vacuum!

Hint for good relationships by the great author James Patterson: "Listen and Compromise."

Hint for preparing papers for publication: Be carefully of the use of personal pronouns such as it, this, that, they. Such pronouns may lead to confusion over what they refer to. For example, consider the sentence: "High-Frequency Gravitational Waves are not absorbed by water, ground or almost any material, hence they are very useful for interplanetary communication." If you do not understand the sentences meaning immediately, then you might think "they" refers to "water, ground or almost any material" not: "High-Frequency Gravitational Waves". Better to write "High-Frequency Gravitational Waves (HFGWs) are not absorbed by water, ground or almost any material, hence HFGWs are very useful for interplanetary communication."

Hint from Cynthia Forde: "God's Present to us IS the present; so enjoy today – ENJOY NOW!"

Hint the Rule of word length: Have you ever wondered what side of a boat the green running light is? I have and it lead me to the *Rule of long words*: the **g-r-e-e-n** running light is on the **s-t-a-r-b-o-a-r-d** or **r-i-g-h-t** side, whereas the **r-e-d** running light is on the **p-o-r-t** or **l-e-f-t** side – note all longer word lengths group together,

then all shorter word length group together. As for switches: **o-f-f** is the **r-i-g-h-t** or **d-o-w-n** position of a switch and **o-n** is **l-e-f-t** or **u-p** switch position. Bathtub, sink or shower **c-o-l-d** facet on **r-i-g-h-t** and **h-o-t** on **l-e-f-t**. Valves: turn the **r-i-g-h-t** to turn **o-f-f** and **l-e-f-t** to turn **o-n**. Don't get too excited: you turn a screwdriver **r-i-g-h-t** to screw **i-n** and **l-e-f-t** to screw **o-u-t** – so -- "The exception proves the rule!"

Hint for aspiring Engineers: Baker's First Law of Innovative Engineering: COPY!

Hint (last one): Each of us is like a candle and we illuminate the World around us differently.

ANONYMOUS SOURCE:

September, 2020:

Relative to: Letter published from Sudip S. Parikh, Chief Executive Officer and Executive Publisher, *Science* journals this month:

Please! PLEASE!! Halt the publishing of the political discourse in the AAAS publications. Joe Biden and Donald Trump are NOT scientists. They deserve absolutely NO mention in AAAS publications!

Science is the search for knowledge of our physical Universe and is apolitical.

"At the AAAS, we are working tirelessly to give voice to those who may feel voiceless or unwelcome." *That is NOT the purpose of SCIENCE*!! The question of Equivalence across ethnic, sexual and origin applies to neither *Basketball* nor *Science.* After Charles Darwin, most scientists believe in evolution based upon the survival of the fittest –because of that acknowledged science fact -- some are unfit and do not succeed or survive in science or any other discipline– the development of our human civilization on our Planet is therefore ***merit based*** and should never depend on ethnicity, skin color, religious preference, or any other extraneous feature of their upbringing. PERIOD! Get used to it, *Homo sapiens*!

I am not signing the foregoing letter of protest because for the first time in my five decades long scientific career, I am fearful to sign my name because of the retribution from (can you believe it?) my ruthless FELLOW SCIENTISTS who will NOT tolerate divergence from a more *liberal* opinion. WHAT HAS SCIENCE AND ITS PUBLICATIONS COME TO??

Signed: Anonymous Source

MY FAVORITE POEM, VERSE OR ADMONITION

At UCLA I had three majors (Physics, Astronomy and Engineering) and I needed 400 units to complete all of the undergraduate and graduate required courses (usually about 200 units needed to graduate with but one major). One of my required elective courses involved *poetry*. It turned out to be one of my most favorite! Alfred Lord Tennyson, Ralph Waldo Emerson (name of my Junior High School), Robert Burns and his poem "To a Louse, On Seeing One on a Lady's Bonnet at Church" was my absolute favorite:

O wad some Pow'r the giftie gi eus to see oursels as ithers see us! It wad frae mony a blunder free us!

Or in usual English:

Oh, would some Power give us the gift to see ourselves as others see us!!

It would from many a blunder free us and avoid many arguments and wars!!!

THE GREAT BICYCLE ROBBERY!

I was watching the TV series *24 Hours*. The lead star Kiefer Sutherland (Jack Bauer) had just apprehended a Bad Guy and ordered him to "Lay down on the floor, facedown, your face turned away from me to the wall, hands spread palms up... **If you move, I will kill you!**" Just then our phone rang. It was our nephew, Ryan Reid, who rented the apartment below us, calling Bonnie: "I have just come upon a fellow in your lower garage attempting to steal my bicycle. Please call 911!" I immediately sprang into action! I open a lock box, grasp my trusty 22-caliber target pistol, and raced down the steps to our garage. There I found Ryan grappling with the young robber. **STOP**! I shouted ""Lay down on the floor, facedown, your face turned away from me to the wall, hands spread palms up. **If you move, I will kill you!"** The young robber immediately complied, he paled –shaking violently, -- all the blood draining from his face! The Police arrived due to Bonnie's 911 call. They took the robber away in their squad car. So far so good, but in few days, I received a call from the District Attorney: "That young bicycle robber's trial is coming up in a couple of weeks. Can you come to the trial and testify as to the discomfort his bad deed caused you? – we hope to send him to jail for several months." I asked "Was this his first offense" – "Yes" the DA replied. "Well, I don't think that jail time is warranted since I scared the living SH-T out of him and that will probably deter him from repeating the crime." No response from the DA.

PORTEND OF THINGS TO COME

Several nights ago, we were out with a couple and I heard Bonnie say "**He only has four years to Go**." "… what did you say honey?"

"Let's see: Your Mom died at 92 and so did Barbara Bush at 92 a week or so ago. You are about 88, so yep, **Four Years to Go!**"

Reminds me of another anecdote: Back when we lived in Marina del Rey, I was at a shopping Center and saw Bonnie and her best Girlfriend, Marylyn Smith, going from shop to shop. I said what are you guys doing? Bonnie replied "$4,000 to Go!" I was reeling happily from a bountiful salary I had from heading up the *Lockheed Astrodynamics Research Center* (LARC). It was the most income I had ever received (in retrospect, it was relatively speaking the largest I would ever receive!) One day a Master Card appeared in our mailbox – preapproved for $8,000. Bonnie took it shopping. She had spent $4,000 and had "… **$4,000 to Go**!"

I must add that when we found the need to economize, Bonnie completely paid back ALL of her charges from HER OWN income. Today, she is the picture of parsimony! Without her super careful management of ALL our finances and adding to our bank account with her Real Estate income we might well be in the "poorhouse"!

Bonnie's younger sister, who was one of my best friends in life passed in October 2021 I wrote the following Eulogy:

It was a day to remember in 1962 – driving North on the San Diego Freeway, near Moraga Drive I remarked to Bonnie "A cute blond in that Volkswagen, just gave a jester with her finger! Do you know who she was?" "Oh sure" replied Bonnie, "…that was my younger sister Merrilee." The next time I saw Merrilee, or rather her Volkswagen, was when I took Bonne back to her old apartment, which housed her Mom, Dad and Merrilee. I said to Bonnie: "Look at that Volkswagen over there, it is up over the curb at an angle just touching a tree trunk!! "Oh" Bonnie said "... that would be Merrilee, she doesn't see very well."

The Lockheed Astrodynamics Research Center (LARC) had just opened in Bel Air and we were looking for a Librarian. Bonnie said "Merrilee is looking for a job ... what about hiring her?" Well, the last person on earth that looked like a LIBRARIAN would be Merrilee. Nevertheless, I hired her! LARC had a few highly Classified Lockheed projects. So, several Secret Documents were stored in the LARC Library. Merrilee told me that she saw the strangest thing in the Lady's Bathroom adjacent to the LARC Library: "One of the women employees was flushing some documents down the toilet after photographing them!" Ah Ha – Merrilee had caught a Spy in our midst!" The FBI were called, and they congratulated Merrilee profusely. A capable Librarian after all!

One evening Bonnie and I were looking for Merrilee since we had some very important files In the LARC library that we had to immediately locate! We knew some evening "places" where Merilee hung out. We started to visit them, but task was enormous hunting through all the lady customers. So, Bonnie suggested "Let's look for her Volkswagen!" There were many customer's Volkswagens parked around, but Merrilee's was easy to find since it would be the one parked eschew probably up against a tree somewhere! Sure, enough we located her in a cocktail-bar booth – I quietly sat down beside her "Bob, what are you doing here? –Did Bonnie allow you out in public – how unusual!"—Merrilee had a quick wit. Her favorite response if someone started to tell her a sad story was "Here's a quarter – phone someone who cares!" Grandson Alexander Fell and I developed a little Vaudeville skit (Bob & Alexander, Vaudeville Link. They call themselves the "Booby Brothers" – the "Booby" is a bird found in the "Galapagos" Islands that Alexander and I viewed in 2013. Please see:

https://www.youtube.com/watch?v=vUGJUTFOe7Y} and we parroted some of Merrilee's jokes.

and we parroted some of Merrilee's jokes. For example: a fellow with a speech impediment applied for a job as a Toothbrush Salesman. The Sales Manager complained:" I can't hire you the way you talk. "B-B-ut Sir – I ca-ca can… just give me-e a hundred toothbrushes to seeell!" OK and --and the fellow returned in an hour having sold the 100 toothbrushes! "Please give me a thousand tooth – tooth --brushes "He sold them ALL by the end of the day! The Sales Manager said his performance was truly amazing and ask him to the next Sales Meeting and tell all the sales force how you did it. "This man is amazing – even with speech impediment – Please tell us how you did it" "Well I go-oo to the A-airport and set up two ta-bles fur the retuning passengers – chips on one and dip on the other. The pa-asengers arrive and put a chip in the dip" They say: "This dip tastes like shit!!!" I tell them: "It **IS** shit "Would you like to buy a toothbrush?"

Merrilee was very smart and learned, on her own, to be an Executive Secretary. I left LARC and became the Manager of a startup Company, Computer Sciences Corporation (CSC). This time I took Merrilee along as MY Secretary. Merrilee decided to head out on her own and I took her out for a Departure Luncheon from CSC. Since she would probably have a drink or two, I did not want her to pilot her Volkswagen, so we went together in my car. At lunch Merrilee had way more than two Stingers (brandy, white crème de menthe, and ice in a cocktail shaker). I did not want her to navigate home alone in her Volkswagen. So, I took her to Bonnie's and my Apartment, but Bonnie was at work. I parked near our Apartment elevator and struggled to "escort" Merrilee to the elevator – it was a most difficult task. Entering the elevator, I propped Merrilee up against one of its walls. The Apartment Manager was already in the elevator and looked quizzically at us – I said to him: "Oh, this is my secretary." He responded, "Anything you say Boss!"

But this is not the end of our little journey. Escorting Merrilee from the elevator down to our Apartment was a horrendous struggle – for example, on the way little Merrilee stumbled over three flowerpots and somehow broke them all! Once inside Bonnie's and my Apartment Merrilee announced, "I have to go potty now." OK I Merrilee was very smart and learned, on her own, to be an Executive Secretary. I left LARC and became the Manager of a startup Company, Computer Sciences Corporation (CSC). This time I took Merrilee along as MY Secretary. Merrilee decided to head out on her own and I took her out for a Departure Luncheon from

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I know right now Merrilee is in the Promised Land cracking jokes with the Almighty!

Keep smiling Merrilee, we love you.

Bob

One last thing – I love humor, just love it since we take ourselves far too seriously. I asked the famous TV host and comedian Art Linkletter one time – "So Art, what makes a joke?" Without a beat he said: "Surprise!" So, let's all keep being "surprised" and have more fun in life!
Allow me to end my story by giving you one of Art Linkletter's great jokes – especially appropriate for a mature person like me: A politician was visiting an old-folks home to garner votes. After introducing himself to all and glad handing everyone, he said to one of the residents "Of course, you know who I am?" She replied "No, but if you go to the front desk, they will tell you!" OK one last piece of humor: Grandson Tyler Baker at 13 was trying out for a baseball team and wanted to be noticed

"Grandmother Baker, Bonnie. to Tyler Baker:

"When you are pitching, you must call attention to yourself, by pitching fast balls or curved balls. When I was trying out for Cheer Leader, in High School, I frizzed my hair and put on lipstick to call attention to myself."

Grandfather Baker to Tyler Baker: "Tyler I can guarantee if you frizz your hair and put on lipstick you will definitely call attention to yourself!!"

APPENDIX I

Our Trip to India 2007

(Extracted from emails composed by Bonnie Baker, converted to PDF by Gary Stevenson)

Well friends — thank you for the Happy Anniversary greetings. Our last night in Calcutta (Kolkata) we dined romantically with this darling couple who live 1/2 time in Cambridge Mass and 1/2 time in Delhi. They are architects and re-did a Victorian house in Mass and built a beautiful B&B with their home in Delhi. They are 38 and 41 — adorable!! We dined on Bengali food. Left the next AM to Varanasi via Delhi so it was a tiring day and when we arrived in Varanasi, they took us immediately to the Ganges to watch the sunset — this place is a MUST! If you don't have time for Calcutta - fine - but this is a MUST SEE! The place is unbelievable. Dirty/3 million people in only a few miles - the streets and bazaars are crazy with selling we took the rickshaw as you can only get down to Ganges that way or walking. The human rickshaws are in Calcutta still, but here they use the bike to pedal you. At night we sat out in the Ganges watching the cremations - the sun going down - the moon appearing — the chanting of all the Hindus — it was mystical - beautiful - holy — this is the Holy City! That evening we just had a little wine and went to bed early as we had to get up at 5:00 AM for the morning Ganges river ride. The same picture but different artist!! This AM they were bathing in the river — again all the people praying and chanting down on the banks — it truly is a sight to see. We just love India!!! Onward today to see the temples with all the nudes!! Will tell you more later

Friends: As I left you with Varanasi — that is a MUST — we then went on to Khajuraho which is famous for the Kama Sutra temples — fabulous — their hand-made embroidery work is quite famous and beautiful here. We traveled by car for the next 6 hours to Bandhavgarh to a Taj/CC of Africa resort called Mahua Kathi. It is FABULOUS — we are out in the forest — very similar to the safaris in Africa. We saw the famous Tiger yesterday while on safari and hear the growls quite a few times which they say is quite rare. Last night they did dinner by the bonfire, and it was lovely with the tribal dancers and music in the background — we even got up and danced with them — fun!! Today I am cooking with the chef for lunch — Bob is relaxing and tomorrow we leave by train for Agra overnight. They will prepare our dinner and send wine with us as they said there is

nothing on the train even though we are first class with our own compartment — we shall see what that is like — Agra next!!!!

If 1 don't get to say Happy Thanksgiving on the day here it is to all of you!! We will be at the Aman resorts on Thanksgiving Day - Aman Bagh – so who knows what we will be eating.

I forgot to tell you about the python that stays in the kitchen and lays in the rafters of the kitchen and comes down and feeds every so often – so exciting to see this – it was at Tiger Tops. When we arrived at Mahua Kothi (Africa/Taj resort) we were greeting by Emanuel who we had met at Mnemba Island in Zanzibar – can you believe this!! She is operations manager for CC Africa. WE had a wonderful 4 days and saw the Tiger – crossed right in front of us + another tiger with 3 cubs – this forest is fabulous for viewing the tigers. When we came back to the lodge there was a tub filled with hot water and bubbles and flowers for my aching body (the roads are a little tough). We had champagne that night and dined way out in the bush – again around a bonfire!! The people here were not that exciting, but the service and food were great. I then took the luncheon cooking class which was fun. We then were driven 3 hours to Kathi to get the train overnight to Agra. Of course, we are a riot with all of our luggage. First, they put us into a compartment with 2 other people. I then saw an empty one for two. I tipped the man and we went in there - stored the luggage except for a few handbags. The lodge had prepared dinner for us with wine so we had a nice 3 hours – the porter came in and made up the beds – Bob on top and I proceeded to put on my pjs and then the door was banging – YOU ARE IN THE WRONG COMPARTMENT – YOU MUST LEAVE!! Felt like we were in Germany. Anyway, he was awful and rude (conductor) – I got dressed finally and opened the door – he made us move back to the other compartment... we almost died. I then called our agent and she said that never happens but evidently a Senator arrived and wanted the private "coupe". Bob was furious – ruined the evening – then the man in the compartment went and had a talk with the senator and he felt so bad the way we were treated he said we could have the room back – of course we went back as it had a sink/mirror/closet. The porter never came back to make up the beds - so I did – the train was very bumpy, and we arrived in Agra at 4:30 AM exhausted of course (even though the train was an experience it would have been OK if that had not have happened. We went to the room - Amar villas – gorgeous -

– our room and balcony overlook the Taj. Got organized and met the guide at 6:00 to go by golf cart to the Taj –they are the only hotel allowed to do this. We stayed until 8:00 watching the sun come up – gorgeous – came back to the hotel. Sharon Fadem and Roberta Haft have just arrived. I am going for a massage and get my nails done

and we shall see them later..... have a wonderful week – next week starts LACC Christmas luncheon – wow!!! We are off to Aman resorts - Aman Bagh next.

Oh forgot to tell you – when we flew from Varanasi to Khar Juho

— Bob had a tiny bottle of scotch in his pocket and they would not let him take it – so he said OK drink it here - he did – they cracked up laughing. "If I can't take in the pocket I'll take it in my tummy!"

As we left Agra — we stopped at the Red Fort (Ft. Agra) built by King Akbar the Great. The first moat was filled with water - the second moat filled with lions, tigers, and elephants to destroy those if they made it past the first one — an unbelievable fort and a piece of history that is truly amazing. The Mughals lived a fabulous life and Akbar was the first one to marry Hindu/Islam/Christians — he used all the different forms of architecture also as he wanted a peaceful country and was very much loved. The Baby Taj was also beautiful to see which was built first — to get there we had to cross this bridge which was a trip in itself — jitneys going this way - cars going another way - bikes - you felt like the bridge would not hold us all - water buffalo below - women washing their clothes in the river - sheets being washed and laid out to dry. The hotel - Amar villas was unbelievable for those who have not seen it — very long with all the rooms looking straight at the Taj — the pool or pools of water are below on different levels and then the beautiful vegetation — unbelievable especially at night with all the lights on -the chants - the dancing on the rooftop of the pool cabana — magical. We then left Agra and traveled to Fatehpur Sikri — some call it the Ghost Fort. it took only 15 years to build it but Akbar was needed closer to Pakistan because of warders coming in so they all departed — again a historical site and the huge fortress walls going around it were fantastic. Then drove to Aiwar and had lunch at The Bagh — very interesting spa/hotel/restaurant — best food we have had except for Nepal. Continued another 4 hours to Aman Bagh — well this takes the cake — the most beautiful setting against the mountains and a river — the Aman resort built it like an Indian Palace filled with Havelis — we have a courtyard on one side enclosed with a couch/table and a garden on the other side overlooking the river and the trees are filled with monkeys with lounge chairs. Inside is a living room on one side with a desk in the middle and then the bed set upon marble — the whole room is marble — the bathroom gigantic — they used both Hindu and Islam architecture which makes it very very interesting and romantic. This morning is Thanksgiving in America — so Happy Thanksgiving again to you all. We are off to ride the camels at 9:30 AM. The roads are a hoot. The saying is "We do not take our children to the zoo — we live in a zoo"

On the roads are camels, elephants, goats, oxen, street dogs, bikes, trucks decorated so much you cannot believe it - horses, donkeys - some painted — it is just fantastic. We are now in Rajasthan and the colors are very bright —again the women look beautiful even while building the roads they are dressed up. This is the first hotel (Aman Bagh) where everyone is dressed up - men in jackets for dinner. Should be a quiet day after the camel ride — we leave at 7:00 AM for Oberoi Vanya villas Tented Camp to safari again and then will dump more clothes. Have dumped 6 pairs of shoes already — we are filled with salt - swollen - fat - YUKI! but what fun getting there. OH, I forgot have you guys ever heard of the heated under blankets? While at Mahua Kothi our beds were turned on every night and the blanket goes under the mattress cover to heat up both sides of the sheets when you climb in — wow was that wonderful ... people from UK use them all the time — have never seen them. Until the next experience Love from the Bakers Dear Friends: Aman Bagh translates as a "garden of peace" – it is an Oasis of greenery in the Aravalli Hills and Knolls. We have now seen the Oldest and the Newest mountains in India – Oldest: Aravali – Newest: Himalayas. We then drove to Ranthambore - morning drive – no tigers – thank heavens we saw the tigers in Bandhavgarh - this area dates back to 944 AD – unbelievable fort. The Oberoi Vanya Vilas is 20 acres with 25 tented villas with lily ponds surrounding them overlooking the forest. We finally had 2 days in the afternoon by the pool – beautiful weather - cold in the AM and PM and slightly warm in the daytime. Tonight, we had 5:00 PM cocktails on top of the Observatory Tower which overlooks the camp plus the forest. Fabulous. In the AM we drove to Jaipur – City Palace and the Palace of Winds. The Royal Family still occupies a part of the City Palace. We then visited the Jantar Mantar Observatory built around 1730 by Maharaja Jai Singh – very accurate readings. This is a city of marble. We stayed at the Rumbaugh Palace. This hotel is FANTASTIC!!! We flipped again – this Hotel is a MUST!!! The dining room is so exquisite you cannot believe it — they had a dance performance tonight and they chose another couple plus Bob and myself to get up and dance with all the sticks –then this tiny many comes out riding a fake horse and bobs up and down – all I could think of was having Alexander and Harrison watching all these treasured moments – so many jewels in this city you are almost sick seeing so much and the prices compared to high end – so inexpensive. Saw a 6.25 carat bracelet for $2500 and Fred Leighton sells it in his catalog for $14,000. Saw a 28-carat diamond bracelet for $6,400 + 35 gm of gold. Anyone interested????The next day we traced Jaipur's history at the Amber Fort. Had a beautiful 2 piece outfit made – 2 fittings and it still doesn't fit – he is remaking the whole outfit – nightmare, but their problem so he said it will be perfect tomorrow and he will bring it at 12:00 noon so I have a chance for one more fitting – YUK!!!We then transferred out of the city to the Oberoi Raja Vilas - 30 acres of gardens and fountains and oasis. If you can only choose ONE place – choose Ramberg Palace not the Raja

Vilas. Jaipur is a shopper's delight - carpets, Persian designs, gems – beautiful. Friday we drove 3.5 hours to Shahpur to experience India to Shahpur. The Shahpur Bagh was the summer home of its early rulers. The estate is set in 30 acres of gardens and surrounded by lakes and for you bird watchers - a paradise. Lots of artisans and again more forts - boating trips. The next day we drove for 3 hours to luxurious Oberoi Davila's. The legendary Ranas or kings of this state traced their ancestry back to the sun! It is on the famous Lake Pecola and designed a traditional Rajasthani Palace – again 30 acres of luxury – our room with a private pool – Love it!!!

Well guess what is on the front page of India Times? Hillary Clinton and her Aide are a twosome??? Was this in the US? Evidently her aid is from India and was a White House Aide starting in 1996 (the time of Monica) and then became closer to Hillary during the 2000 election.

OK — had to bore you guys again — what a DAY!!! We are staying at Oberon Villas and this place is incredible. There is the pool for the hotel; a spa hotel and then a long pool with 10 or so rooms off of it — we have a private patio with steps into this long semi-private pool — and it overlooks the lake - Lake Palace and the Palace. We went to the Palace and our guide is fantastic — he is a history book onto himself which I will not bore you all with as India is a place you must go and feel it and learn about it. We loved the Palace this is the wedding season, so the king rents out an area for wedding which one was being prepared for. He has rented out two areas for hotels which were lovely. We then went to the ladies gardens which was beautiful - did some shopping - and then our guide said 'Would you two like to go to a wedding tonight" — he was going to two weddings. We said "We would love it". We then went to a shop and got Bob a turban and the top and pajamas. Ran back to the hotel — I put my two "diamond" necklaces around his neck (Joni — you know which ones) — he looked smashing. I then put on my fantastic Indian outfit I brought from the US with tons of jewelry — like going to a costume party and you know how I love that. When the guide picked us up he about died and said we are definitely going to the Royal Wedding about 12 km outside of town because of the way we looked. We first did a boat trip on the lake over to a beautiful place and my gosh here was the king and his 23-year-old son — how lucky were we ... this place was getting ready for an Indian wedding — the man is from the US and the canopy he was building was all mirrors and a marble floor — the wedding party was staying at Lake Palace Hotel for 6 days. We then left there and proceeded to the wedding. Sunset — her comes the groom all decked out riding an elephant that was all decorated — the band was before him - it was something out of a movie. The women are at one end - the men at another end so I joined the women and Bob went with the men. They *were* in

awe of us both and had a wonderful time as the kids were all around me and wanted to speak English. Then the groom came into the women's tent —went off the elephant and they decorated him even more (arranged marriage as you all know) — then he went to meet the bride in a separate room — she is all covered — another ceremony — they actually TIE THE KNOT!!! Back into the tent for another ceremony — then we had to leave — so we then went to the Men's area where they have liquor and food (not the women ... ha ha). Stayed for about 10 minutes and then went to the second wedding. The first wedding was Rajput (warder caste) and they wear different jewelry and clothes and the men have 2 earrings. The next wedding was the business caste. Our guide is the Brahmin caste — so interesting, then visited the guide's home and met his wife and children — absolutely fantastic!! He then gathered his family and went back to the wedding and we took off for the Lake Palace for an 8:30 PM dinner. The dock to the Lake Palace is unbelievable with beautiful wrought iron and wood floors and couches and chairs on the dock — we had the Talli dinner and called the Oberoi boat to pick us up — it was truly a magical fairytale evening — a memory!!Well guess what is on the front page of India Times? Hillary Clinton and her Aide are a twosome??? Was this in the US? Evidently her aid is from India and was a White House Aide starting in 1996 (the time of Monica) and then became closer to Hillary during the 2000 election.

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We visited the Ellora Caves situated about 30 kms (1 hr) away from Aurangabad. There are 34 Hindu, Jain and Buddhist caves at Ellora cut out of the volcanic lava of the deccan trap. Lying near an important ancient trade route between Ujjain and the west coast, the caves that were abandoned and forgotten are believed to be the work of priests and craftsmen who used the route. They tell the story of the evolution of these three religions. Over 2000 years old, they have been compared to the pyramids for their amazing

construction, sculptures and frescoes. The most marvelous of all is the stupendous rock temple of Kailash.

We then visited Bibi-ka-Maqbara or the poor man's Taj Mahal as it is called was built in 1679 by Aurangzeb's son for his mother. It is a simple replica of both design and execution. It is an interesting building and the only example of Mughal architecture in the Deccan plateau.

Off to —SOUTH INDIA — a retreat called Nilayam Hermitage on the crest of a tropical hill and very different to the typical five-star hotel. The boutique hotel was designed by a Goan architect, and the owner Claudia has added the finer touches. Cosmically themed with fantasy food here is a subtle blend of eastern and western flavors, masterminded by the French chef. There is no starched formality, and the atmosphere is more house party than a hotel.

Room #8 is the best called STARS — we became lounge lizards for 5 days - no tours!!! FABULOUS food!!!! My thighs are now touching as I walk YUK!!!

Lush and lovely Goa was created as a place for relaxation where Sun worship is a cult form. In quiet and complete contrast to other ports and places on the Indian sub-continent, Goa offers a quaint reflection of its colonial Portuguese past well assimilated with its democratic Indian present.

Bangalore is India's most congenial city and has survived the dynamic growth of computer and high tech industries which have given it the reputation as an Indian Silicon Valley. BAD WEATHER — RAIN — Thank heavens for the Oberoi — we have been in so many they upgraded us to the Presidential Suite.

In the morning, we drove to Mysore for 3 hrs. via visiting Somnathpur the site of one of the three famous Hoy Sala temples. This is called the Kesaya temple, last to be built in AD 1268 in a somnolent village. The visit is well worth making to see the degree of sculptural and structural precision that the art of temple building could attain. On arrival at Mysore, we proceeded for lunch at the Lalitha Mahal Palace. Post lunch we visited the palace of the maharaja within the old fort is admittedly one of the most beautiful buildings in India. Fabulous Palace. Bought some beautiful fabric and hopefully have an outfit made in Cochin ... probably dress Indian for the next year or so ... ha ha

We drove for two hours through the desert countryside towards the principality of Manvar for a camp experience amidst the sand dunes. The desert was beautiful,

magical. Riding on individual camels, we embark on a short safari to enjoy these moments over cocktails as an orange hue gets cast over the dunes. BUT have you ever been on a Camel ride? Ask Bob. Getting on a horse is a challenge for him– a camel is far worse! His camel took an immediate dislike for him – actually tried to "brush him off" on bushes! As sunset approached (it was a sunset camel ride) he kept exclaiming "I think the sun is down – time to get off our camels!" Well, if you think getting on a camel was difficult for him – getting off was almost a disaster! Then a figure holding a platter approached us over the dunes. Not Lawrence of Arabia, but better – he was holding a tray of glasses of champagne. Fabulous in the middle of the desert! We followed him over the dunes and then we saw our destination: a tent set up as a bedroom (complete with those wonderful hot-water bottles) with a bathroom tent behind. At dusk our campsite was surrounded by flaming torches. Outside our tents a desert banquet was being prepared with campfires, all provide from a kitchen bar situated on a nearby dune – waiters and a bar tender paraded down with food and drink. To top things off, gypsy dancers and desert musicians appeared to entertain us – worrisome to Bob our camels and their drivers lurked on the sand behind them. We slept with warm feet below and beautiful, bright stars above! I am reminded of the phrase:

"The little festive atmosphere of strangeness, of excitement that only a holiday bedroom brings. This is ours for the moment, but no more. ." Daphne Du Maurier

Next, off to Chennai – EAST COAST on the BAY of Bengal – Fabulous Resort – cancelled all the tours...at the Fisherman's Cove Resort located outside the Madras municipality and a short distance from the coastal village of Mahabalipuram. We have a Sea Cottage on the Beach #11 – fresh lobster/prawns on the beach today for lunch –a WOW – the chef came over and I will cook with him tomorrow AM and then tonight we are invited to the Manager's cocktail party. They are playing volleyball on the beach as I type – the bad Tsunami hit here 2 years ago if you remember. Just arrived so more to come..... Update: WOW – had a ball at the cooking classes – made coconut rice; tamarind rice, raw mango and prawn curry, and red snapper with masala wrapped in a banana leaf then he invited us to go grocery shopping – so we did and picked up some spices to bring back plus we visited his home and then off to the beach to meet his wife – she sells food on the beach – of course everyone stared – it was a riot!! They are all so colorful and the children smiling and everybody except the old speak English. Last night we had cocktails on the terrace as we watched 5 little Indian girls sing and dance Christmas Carols – the trees are decorated with balls - poinsettias all over and Christmas trees all decorated.

Today the weather is a little overcast maybe hit the gym and spa. Well we worked out and the weather is now beautiful – again the girls sang – they came over to us and we discovered they are "home schooled" and the parents are Christians and taught them English when they were born and they travel to help others throughout India – fabulous family. Everybody talks to us – the chefs keep coming over – it is so magical here – tonight they put a table out on the rocks overlooking the bay – the full moon was shining on the water – pasta – the best – Sula (Indian chardonnay) – truly magnificent – Hawaii 70 years ago. All the cottages are separate on the Bay –with grass in front (WWII in Hawaii) – the roofs are shells – the room is in the round – the people here (totally sold-out for holidays) are very wealthy Indians – a lot from London coming back to be with their families – they are SO friendly!! What a ball!! Again, Christmas is *here* all around us.

On the way now to Pondicherry for Christmas Eve — Mahabalipuram, also known as Malappuram, was built by the Pallavi king Mahendran Varman as a seaport to connect his empire with Southeast Asia. Amongst the plethora of Hindu temples built by this dynasty in the 7th *century,* the major ones are in Mahabalipuram; the graceful shore temple, the cave temple, the single stone granite 'Rathi's' or chariot temples and the world's largest bas relief with themes from Hindu mythology called both 'Arjuna's Penance' and 'Descent of the Ganges'. The excellent quality of figure sculpture in the Mahabalipuram group of temples set the tone for the development of plastic art in later years. This movement was soon to blossom into the great classic art of Java and Angkor! In the proximity of the rock-cut temples is a huge whale-back rock on which the Pallava artists have chiseled in thick profusion some of the finest sculptures known to belong to ancient India. Monkeys, lions, elephants, deer and a host of wild animals along with ascetics in meditation and mythical serpent gods have been carved with great vigor, realism and charm. Of course there is the treachery of drifting sands

We took a heritage walk through the old town to experience the spirit of Pondicherry and the nature of its architectural traditions. There are few monumental buildings in Pondicherry its architectural character is a result of hundreds of French and Tamil houses that create the 'milieu'. Pondi has two distinct parts, the French and the Tamil. The French quarter has structures in the European classical style, whereas the buildings in the Tamil quarter are in the vernacular style of Tamil Nadu. The two styles have influenced each other with the result that many buildings in both parts of town are a harmonious blend of European and Tamil patterns.

Christmas Eve: Hopefully a French dinner – Merry, Merry to you all and I will continue with the journey! Last night we dined at Le Dupleix — the other property of the

Promenade**.** Mansion in the French quarter restored. Room #5 is the one to have — fabulous place and 4,'Ular..; we would have stayed there. I prefer historical to high-tech, but the view here is great. They had a 7-course French Christmas dinner (finished at 11:00 PM)._ — even Santa Claus arrived. We dined in the interior courtyard (sold out — but we were able to con them into one more table out there). The people are so nice and accommodating. Today is Christmas Day and I think we will walk. This is a lovely walking area — and all the streets are French named — let's see what Bon Bon finds today!!! Oh yes ,, of course we got all dressed up and I finally wore the one little black dress I brought to India adorned with all my fake diamonds etc. Then it seemed a little short for India so I put my black lace leggings on underneath and it mad the outfit so "chic" — fun!!!!

The hotel is doing a Christmas brunch with turkey ... tonight *dinner* at Hotel DeL'Orient. Le Dupleix is an 18th century French colonial villa here in Pondicherry (now a unique boutique hotel). In the courtyard the Gourmet Restaurant under the mango tree serves Indian and International cuisine with some French items. I went into the restroom — came out to wash my hands and out walked from another stall a gorgeous Indian man. I almost died and started to apologize stating I thought it was the lady's toilet. He explained it was a "common" toilet and we both laughed. He was born and raised in London and now has moved back to India. We were told that next year the hotel would be listed under Chateau Relias. December 25th we took a tong walk through the "French quarter" — don't get me wrong ..this is India and the rest is truly like any Indian city, but this area is adorable. Found some cute scarves and a darling pair of 3/4 cotton pants specially made by the "ex-hippies" in this Aireville area outside of town — anyway, that is what we call them. Then we came back for Christmas Buffet at Promenade Hotel — took a nap — walked the Promenade for 30 minutes — PACKED with people — a fair — Santa etc. They all love festivals. They were all posing in front of our hotels for photos — probably because of the lighted trees and it is the prettiest on the promenade. Then we had dinner at Hotel de ('Orient--Conde Nast says "A rare example of thoughtful historical restoration in a country where lack of funds often necessitates shortcuts." — This is a very very special area. On the way to Swami Alai

We stopped at the Gangaikondachoilapuram temple (YIKES) from the Chola Dynasty — just ok. Remember South India is NOT like North India. No beautiful Palaces — no glamour warm weather — beautiful countryside like old Hawaii — Costa Rica etc.etc. Checked into the Sterling Resort — very different — built in 1886 - we are in an old plantation (sugar-cane) that was bought up and made into a small hotel. We have room 119 — the only large room. Food etc. is so much less expensive than Northern India plus they do not have the same type of hotels. We have 5 rooms — living room —

bedroom — luggage room/closet: small bathroom and a large outside bathtub done like a huge shell or lotus flower == unreal and so cute. Just had lunch - $9 — boy what a change. At *dinner* there was one of the most unusual floor shows — Indian classical music followed by a comedy where the man comes out dancing with 4 legs then changed clothes and came out dressed like a small midget was holding him up and did all these contortions == the finale was truly amazing and he was a fire-eater plus he lit up his whole body with fire — truly fantastic — of course you think you are in the South Pacific — the people are also darker. The Indians are so SWEET I cannot tell you. On the road we stopped to buy fresh, and I do mean FRESH cashews just removed from the shells) — the ladies just stared and I gave them toiletries that I carry from the hotels and a coconut necklace — the smiles were priceless. Maybe you should do southern India first and go north. Just hear they kicked all the tourists out of GOA — political unrest in that area — interesting. Said they were closed for. New Years — all tourists go elsewhere. We are now on the road for the next 12 days — love having no flights and we have a wonderful driver and guide. Left in the AM for Tanjore — used to be the capital of Chola Dynasty —more temples — the third largest temple in India and absolutely gorgeous and huge — had lunch at Parisutham Hotel and off to Chetana. This is the land of the legendary Chettiars — they built their homes fortress=like mansions and filled them with the wealth amassed from across the sea == big ship traders. We explored all the fabulous mansions, antique shops and precious jewels. Hotel Bangla is a quaint assortment of buildings — art deco period and now a Heritage Hotel with only 8 rooms — home cooked cuisine.... Some of the best we have had. We have room #1 — room #3 is also great but 3 flights of stairs. At lunch we had 7 servants and 4 ladies just gawking at us — the lunch was served on banana leaves — this is family-run. For a lot of you — you might not like southern India unless you are on a long trip like we are. The North is glamorous, and the South is not, but the landscape is more beautiful.

Off to Madurai — now in the Dravidian countryside. Most southern Indians are called Dravidians and northern Indians are referred to as Aryans, this city goes back to 6th century B.C. when it traded with Rome and Greece —Hotel Taj Garden Retreat.

Off to Permeate (4.5 hrs) — again plantation areas. We are guests of Mariama and Michael Kallivayalil. The plantation is over 10,000 acres and a beautiful home which was formerly the summer residence of the Maharajah of Travancore.

HAPPY NEW YEARS!

Fanciful spoof for your Happy New Year 2021:

BONNIE BAKER FOR PRESIDENT!

In the **"***Female, first, foremost & only" Political* Party

My Presidency will be supported by two strong Pillars:

The Constitution of the United States

And *SCIENCE*

Specifically, *"Survival of the fittest"* that is the rule on our planet and most probably governs all life forms in our Universe and will be **absolutely applied and enforced**!

Most of my friends, at least those that I like, believe me to be overqualified for President of the United States but, in any event here is my

RESUME: My last experience as a President was in 2008 when I held that position at my firm "***Let me set your Table."*** In that position all considered me the ***"Energizing Bunny!" (***or was it" *Bonnie?")* Unfortunately, due to Congresses' belief that everyone should have a loan (Mortgage) whether or not they could

make payments or repay the loan, the economy and my firm went belly up! That would never happen in my Administration since my POLICY would be to provide every citizen their Dream Home, whether or not they could afford it since it was good for their General Welfare!

I reserve the **RIGHT**, based upon my advanced age and immaturity, to relinquish my Presidency at any time to my Daughter, Robin Baker Fell, due to her ET-like advanced intelligence and great maturity.

IN ORDER FOR THE VOTERS TO BETTER JUDGE MY PRESIDENCY I WILL MAKE THE FOLLOWING APPOINTMENTS IN ADVANCE. ALTHOUGH CERTAINLY A VERY, VERY GREAT HONOR, DO NOT ASSUME ANYONE HAS ACEPTED THESE APPOINTMENTS HOWEVER:

VICE President: **Patsy Moller:**	In charge of "*Vice*" and responsible for our Group's Happiness
Director of Foreign Affairs:	Dusanka Schmidt: "Limit of 5 Affairs a month"
Representative to the United Nations:	Holly Merrigan: "Wishes to move to another Nation and possibly take it - over."

Controller of Alcoholic Beverages	Kelly Reid Smith: “Alcohol is best to consume because no great story is ever started by someone eating a salad!”
Secretary of Religion and Secular Affairs	Cynthia Vold Ford, Beatty: “Only ordained Minister I know”
Secretary of State:	Michelle Corey: “Can arrange to get you to any State you want”
Secretary of Defense	Von Rae Woods: “You don’t want to mess with her!!”
Secretary of Health:	Joani Deuel: “She walks among the sick and is unaffected– think a beautiful goddess.”
Attorney General:	Pamela Ruehrdanz: “Smart as a whip and knows how to use one “
Secretary of Conspiracy Theories:	Monica Panno “Check with Dirk!”
Secretary of Entertainment:	Judith Mancini: ”She can magically make a silk Purse into a Sow’s ear– a Great Performer!”
Secretary of Education:	Jane Foster: “Really educated – she’s certainly been around!”
Secretary of the Interior/Exterior:	Brenda Sexton: She knows the Ends/Outs or Interior/Exterior, since she was the former CEO of “IN-N-OUT Burger”
Secretary of Veteran Affairs:	Penny Ryan: “It takes a four-star wife to run a four-star Veteran’s Hospital!”
Secretary of the Treasury:	Barbara Richman: “We need a Rich Woman for such a position, but a ‘RichMan’ will do!”

Presidential Chef:	Nina O'Hern: "Fabulous Roasted Chicken and potatoes – watch out for her deserts!"
Dog Catcher General:	Merrilee Reid "If my Dogs bother you, then I would be pleased to lock you up in my closet!"

In order to avoid even the appearance of *Identity Politics* I will assign each Appointee a male or LGBT secretary, housekeeper and/or cook.

POLICIES:

I will follow the Constitution specifically "Article I, section 8 of the U. S. Constitution that grants Congress the power to … provide for the … General Welfare of the United States." My Administration will especially promote laws in our in Congress to implement this "*General Welfare"* Clause; just as I interpret it. To wit:

I will propose to Congress that, for our *General Welfare,* all education (primary, secondary and College/University including Graduate: MA, PhD, etc.,) will be paid for by my proposed Government plus all student loans paid off. Likewise, all medical costs, all living costs such as our Mortgages for every citizen's Dream Home, will be paid off by my Administration's proposed Government, all other lodging, food, entertainment, etc. expenses I propose will also be at my government's expense since I believe they are **absolutely necessary** for every citizen's **General Welfare**!

WHAT ABOUT GLOBAL WARMING? Again, we must turn to SCIENCE. We cannot dismiss the fact that for millions of years, well before the advent of man or industrial pollution on our planet, there were glaciers and global warming always melted them – SCIENCE, especially Bob's Astrodynamics tells us that due unavoidable planetary perturbations we will have global warming and that satellite observations show *much of it comes from growing, distributing, and consuming food on our planet.* So I will propose an **international diet plan to fight global warming** and improve our health!

<u>How to pay for all this?</u> Every citizen (except of course, for undocumented aliens) will pay their *fair share*, which I select to be 10% of their gross income. In order

not to discriminate it will be totally independent of their income, where they live, what they do, **their ethnicity**, their beliefs and anything else that might identify or distinguish them from others! **Not enough money yet? I will simply instruct our Treasury to print more!**

Although "survival of the fittest" is an *absolute law* of all living things from dogs, cats, Homo sapiens, amoebas, elephants, lizards, birds, bees, Bears and Bunnies, it is somewhat in conflict with "Religious Freedom". Specifically, I believe that some faiths want to break the *survival of the fittest law by actually helping those less fit than themselves.* **Can you believe it***!!!* So I will reluctantly allow citizen taxpayers to also offer 10% of their income (often called "tithing" by some Religions) as welfare to those who for some reasons, e.g., by not working as hard as you do or somehow are unlucky (by the way, our Universe does not allow for LUCK!). Possibly these too-kind Policies of mine will be unaccepted by Congress *in order for them, in league with local government leaders, to continue their support of our trash-laden, crime-infested streets!* So if you disagree, then please go and advise Congress (where you will also find some nice bathrooms, and unlike sidewalks, including some actual toilet paper!)

VOTE FOR LOVE AND AFFECTION FOR US BIG-GOVERNNMENT HIJENCKS OR A "LAUGH": VOTE FOR BONNIE BAKER FOR PRESIDENT!

PS As for the pursuit of SCIENCE: Remember Archimedes Principle and have your olives on the side for a "rimmer" Martini!

APPENDIX II

A Theory of Our Universe

Journal of High Energy Physics, Gravitation and Cosmology, October, 2020

PROLOGUE

This Presentation tells the Story of a brand-new picture of how Our Universe was born and is developing and it is dedicated to my wife, Bonnie Sue Baker, whose question years ago, inspired the idea. It is not a BIG BANG but rather a BIG ROLLOUT! Although it may be a bit confusing to the non-scientist, the idea is quite simple: "Time" is what we view on, for example, our wristwatch. But in this case the "Time" starts out like a watch that is running too fast and then is slowing down as our Universe progresses or "rolls out". We look through telescopes that are receiving images of activity that occurred billions of years ago when the light left the scene. Let me use a fictitious example of a "4-minute miler". We watch him run billions of years ago. In this imaginative story he is still capable of a 4-minute mile, but since time is moving fast the stopwatch hands appears to be just racing around as the runner appears to be running real fast. Guess what? By the apparent stopwatch, billions of years ago, the 4-minute runner REAINS 4 minutes! The conclusion is TIME WAS MOVING FASTER BACK THEN THAN IT IS NOW!! An actual situation is a spiral galaxy. When we observe it billions of years ago through a telescope, it appears to be moving around much faster than we would expect it to move today. Now at that fast speed it should fly apart – but it does not! So, scientists assume there is some kind of "Dark Matter", which has never been observed, to hold the galaxy together. NO! I say, time was moving faster back then. That is the beginning of the story that will be told here.

Journal of High Energy Physics, Gravitation and Cosmology

Volume 6, No. 4, 110-129, October 2020

Referee report of Paper ID: 2180520:

A Theory of Our Universe

By Robert M L Baker, Jr.

Despite that this Referee disagrees with some claims of the Author, she would like to see Paper ID: 2180520 published in the *Journal of High Energy Physics, Gravitation and Cosmology* because she feels that this paper can positively contribute to the current hot debate in cosmology. In addition, this Referee generally appreciates the "out of the box" ideas like the ones of this paper. But, before the final acceptance of the paper, for the sake of completeness the Author is requested to stress that the cited dark matter and dark energy problems can be, in principle, achieved in the framework of extended gravity. This is stressed, for example, in *Int. Jour. Mod. Phys. D* 18, 2275 (2009), which must be added to the references.

Einstein was reported to have commented that: "Imagination is more important than knowledge. For knowledge is limited to all we now know and understand, while imagination embraces the entire world, and all there ever will be to know and understand." I Agree! The future will be forged by innovative, *imaginative* "out of the box" thinking! and George Bernard Shaw wrote "*Imagination* is the beginning of *creation* …". Shaw was extremely perceptive. I understand that the author developed his Rollout Theory of *creation,* or the beginning of our Universe, after his wife, Bonnie Baker, *imagined* that it was reasonable that time had a speed like the movement in the other three dimensions.

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A Theory of Our Universe

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Abstract

Contemporary theories of our Universe, such as the Friedmann-Lemaitre-Robertson-Walker (FLRW) model of the cosmos, assume that time marches on at a uniform, constant pace from its very beginning. But what if that is not the case? It is proposed that our Universe is not a "Big Bang", but rather a "Big Rollout" in space and time, spacetime, from the shortest meaningful length, Planck Length, and the shortest meaningful measure of time, Planck Time. It is speculated that time and dimensions, spacetime, grow in concert very rapidly at first. The fundamental equation, which relates the change in the space dimensions to the change in the speed of time at the

beginning of time for the new Theory, is derived. Spacetime rolls out initially at light speed. As time increases, the rate of change of the speed of time could be erratic, that is although in general it slows (rate of time slows approaching zero at the end of time), its rate of change could decelerate, pause or perhaps accelerate for a while, no need however, for dark matter or dark energy.

Keywords

Cosmology Theory, Early Universe, Dark Matter,High-Frequency Relic Gravitational Waves

1. Introduction

In this paper a Theory of our Universe is presented in an unusual manner since this new theory is best understood by pictures rather than by a large number of equations. First of all, it is important to understand the concept of time that is employed in the theory. Not only is time taken to be a dimension of spacetime, but it has a literal meaning as measured by looking at a stopwatch or a wrist-watch—a "measuring device" that can appear, like some clocks, to run too fast or too slow. In fact, time is considered in this approach to be like the framerate of a movie. One can photograph a movie with the frame rate going fast, regular rate or at a slow frame rate. As an example, consider a movie taken in the past of a weight-lifting contest, for example taken billions of years ago. In every section or sequence in the movie the contestants move the weights in accordance with the laws of Physics, yet when the film is viewed from a film taken from a variable-frame-rate camera, the athlete's movements do not always match the reality that the movie viewer expects to see! Secondly, if we observed a variable-rate camera movie taken in the past of a Physics Laboratory, then we might view an experiment to measure the acceleration of gravity appear to obtain incorrect results and likewise an experiment to measure the speed of light could yield inconsistent values. Of course, when all the experiments are photographed by a camera run at the usual frame rate, they yield the expected usual results. We could take a variable-frame-rate movie of a more sophisticated laboratory that measures general-relativity effects including those associated with "World Lines", "Proper Time," etc. Every film clip sequence or even individual frame sequences could be different: first a fast frame rate, then a slow frame rate, then a fast frame rate, then a usual frame rate at today's frame rate or camera speed.

But the correct measurements made at the usual frame rate would disclose that in every film sequence the laboratories operated under the exact same, laws of Physics, even if those laws involved Schrodinger's equation, special and general relativity! The Theory discussed herein, involves a fictitious movie audience, consisting of astronomers viewing extremely old motion pictures, taken perhaps billions of years ago. They are imagined to be viewing a "movie" taken in the past by a variable-frame-rate movie camera! As will be discussed, we associate the frame rate of the fictitious "old movie camera of the past" with the rate or speed of time, for example frames (or seconds) per second and the time itself we associate with the length of the movie film strip that has passed though the camera Imagine such film strip, after exposure spilling out from a broken, open camera case out on to a table. As the spent film slips along the tabletop from the broken camera, picturing past scenes, it would be like time moving out along the time-axis of spacetime. We don't mean to overemphasize this point, but it is critical to understanding the concept! A fast or slow speed of time is not really a new idea, as will be shown, but the idea of a variable speed of time has never be- fore been put into the context of cosmology and a theory of our Universe. More importantly, a fundamental equation governing its operation at the beginning of Our Universe has never previously been derived. By the way, as the fictitious, ancient camera's battery approaches zero charge the movie camera approaches its end of usefulness that is the fate of our Universe!

2. A Theory of Our Universe Is the "Big Rollout"

Our Universe does not start out as a "Big Bang" but rather as a "Big Rollout" in space and time, spacetime from the shortest length, Planck Length, (the smallest measure of length because shorter than it, quantum effects dominate and it becomes meaningless to consider exact values of measurements) and the shortest meaningful measure of time, Planck Time (defined as the time it would take a photon travelling at the speed of light to cross a distance equal to the Planck Length). Please see Figure 1. It is speculated that space and time, spacetime, dimensions grow in concert very rapidly at first (actually spacetime rolling out at light speed) and, in particular, that the time dimension also grows very rapidly at first. However, as a working hypothesis the speed or rate of change of time appears to vary, according to [1]. Our Universe is similar to a malfunctioning wristwatch that is slowing down with age. As time increases, the apparent rate of its change could be erratic, that is although in general the rate of time slows approaching zero at the end of time, time's rate of

change could possibly decelerate, pause or perhaps accelerate for a while since there is no apriori reason for constancy. As will be demonstrated, the speed of light will actually be constant in all time frames of reference since space and time rollout in concert.

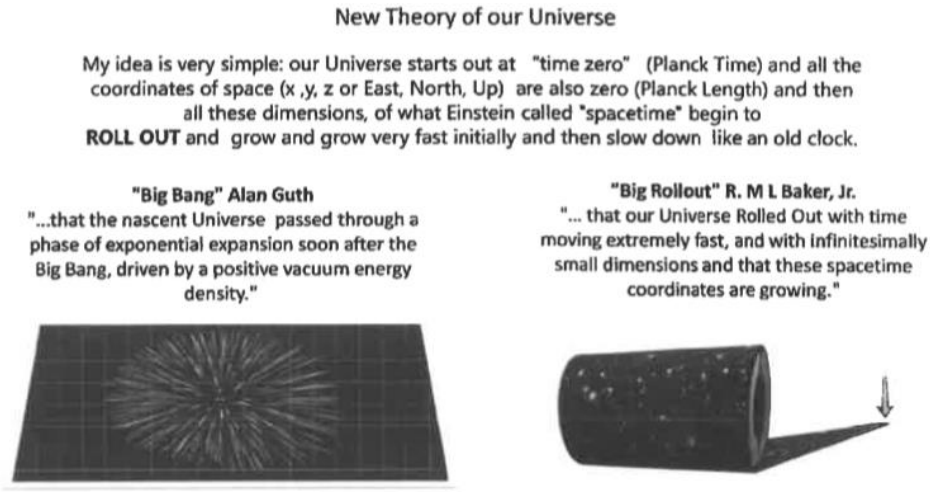

Figure 1. Theories of our Universe.

The Rollout Theory is simpler than some portions of the theory for the Big Bang: such as "...that the nascent Universe passed through a phase of exponential expansion soon after the Big Bang, driven by a positive vacuum energy density [2]" Whereas the proposed Theory depends upon the well understood fast and slow running clocks, therefore by Occam's razor the Rollout Theory is preferable. Since the rotational rate of galaxies (leading to the concept of dark matter) and the variation of the Hubble constant (leading to the concept of dark energy) might well be dependent on the speed of time, their existence might be determined by the speed of time and might, in fact, be utilized to measure the speed of time. Note that if a clock (time) moves fast at a time in the Past, then the seconds, minutes, hours, days and years back then appear much shorter to an observer measuring them using today's time! So that processes would appear to move very rapidly in the early universe and only readily observable by detectors of high-frequency gravitational waves such as the Li-Baker [3] [4] [5].

Galaxies APPEAR to rotate faster in the past if time was moving faster back then (Figure 2). Astronomers have attributed this to a lot more mass or matter in them that holds them together so they can rotate fast and not pull apart. They call it "Dark Matter".

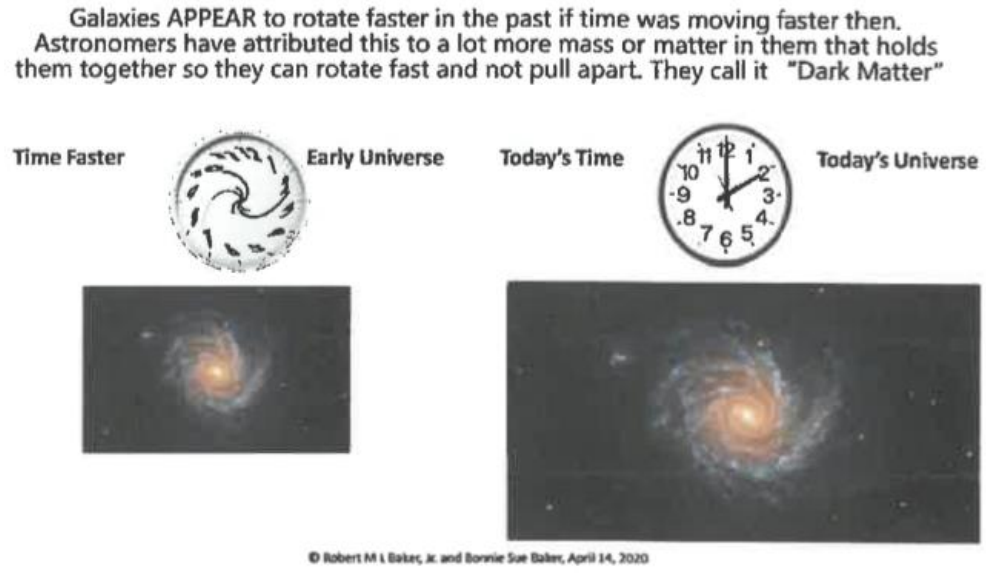

Figure 2. The speed of time slows and space grows in concert from the early universe to today's time.

3. Dark Matter and Dark Energy

Although dark matter and dark energy can be, in principle, predicted in the framework of extended gravity, Mars, Senovilla and Vera [6] of the University of the Basque Country, Spain, theorized that the expansion of our Universe is an "illusion "and actually is the result of the higher speed of time during the period when the light left the stellar structures in the past: "... we are fooled into thinking that the expansion of the Universe is accelerating because time itself is slowing down". So that according to J. Senovilla [7] the speed of time may be related to the "illusions" of dark matter and dark energy estimates. He suggests that the reason that we have not been able to detect dark matter may just be that it does not exist!

Those specializing in the dynamics of galaxies should analyze their motion billions of years ago as resulting from the change in the speed of time (NOT resulting from dark matter). A tool for such an analysis could be differential correction using the change in the speed of time as the parameter or local constant. One could adjust that parameter, the speed of time, by differential correction to match the observed motion of portions of a galaxy.

A notional graph of the change-of-speed-of-time variation with today's time dimension is exhibited in Figure 3. Notice the hypothetical different irregularities and slopes (tangents) especially between 1 and 10^{20} seconds after the "BIG ROLLOUT" or the "start" time zero or Planck Time. As theorized in Figure 3, the most dramatic manifestation of the new Theory will manifest itself for apparent times less than a picosecond after time zero.

The relationship between the change in the speed of time and the change in the space dimensions is important since they rollout in concert in order to preserve the constancy of the speed of light in any given time frame. As we look back through our telescopes and view different earlier times (time frames), the rate of time decreases and dimensions grow in inverse proportion as time moves forward. When the rate of time appears greater in the past, the dimensions appear smaller moving towards today's values. If we were able

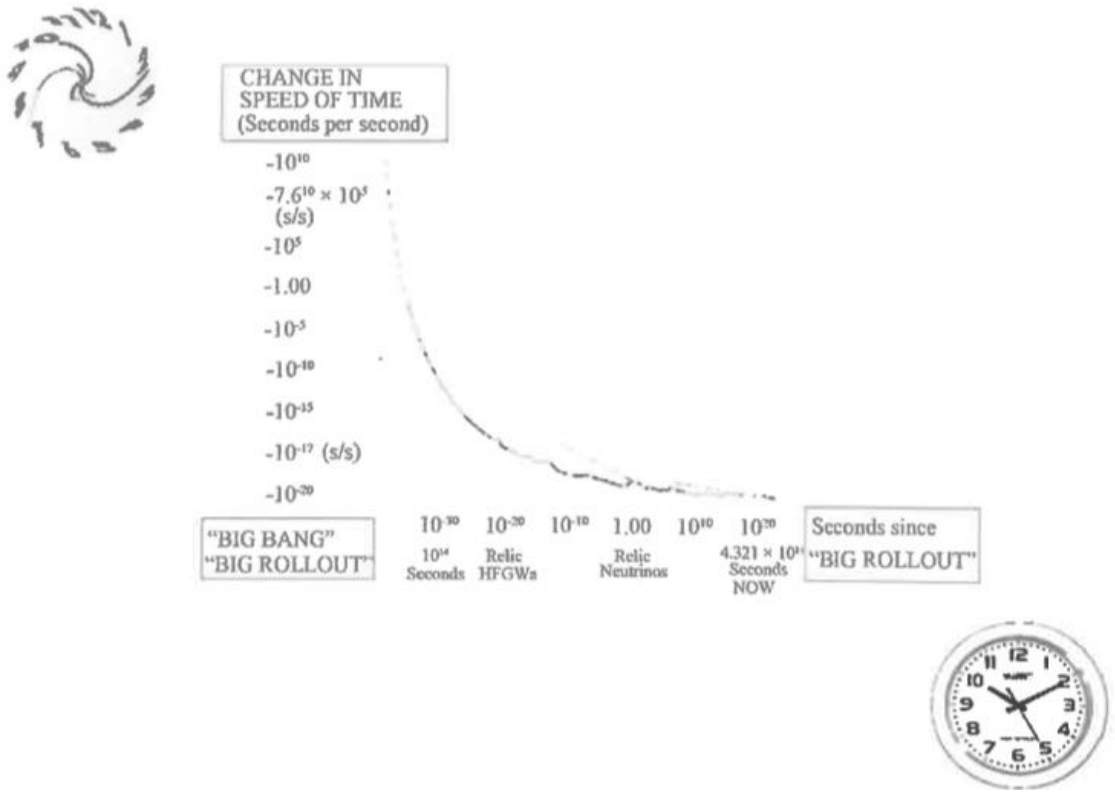

Figure 3. Notional graph of the change-of-speed-of-time variation with today's time dimension.

The graph is conceptual only, it is drawn intentionally in low definition since it is NOT for numerical work.

(From Fig. 3 of [8]).

to view a stopwatch of a "4-minute miler" in the past, when the rate of time actually was greater, we would see its hand moving faster and we see the track is shorter as in Figure 4. If we lived back then, we would see a regular stopwatch moving at a regular rate and the ordinary one-mile-long track! Of course such is the case when we associate the frame rate of the hypothetical movie camera discussed in the Introduction with the rate or speed of time.

Assuming in this fictitious example that the elapsed time between observations made today (defined as time B) and the observed mile-run event (defined as time A) was 5 billion years or 5 x 10^9 years and the difference in the observed or apparent time of the event (start to finish time difference of the mile run) at time A was apparently (1/60th) x (4 minutes) = 4 seconds or 4 x 10^{12} ps and the actual time of the event at time B was 60 times longer or 2.4 x 10^{14}ps, then the fictitious speed of time would be:

Speed of time (at time A) = (observed or apparent duration of the event or activity at time A minus the actual duration of the event or activity at time B in ps)/(elapsed time A to time B in years)

$$= (4 \times 10^{12}\text{ps} - 2.4 \times 10^{14}/(5 \times 10^{9}\text{ years}) \quad (1)$$

= -47,200 ps per year or -4.7 x 10' seconds per year. For comparison (page 63 of [8]), using the actual considered not fictitious and a working hypothesis Muon decay time difference (start to finish decay time difference of two consecutive Muon decays) that is 2,196,980.3 ps - 2,197,013.0 ps = -33 ps between 2007.0 and 2009.5 or 2.5 years elapsed time, then the speed of time was -13 ps per year in 2009.5. There is a big difference here: Muon decay time does NOT involve any space dimensions ONLY TIME! As will be

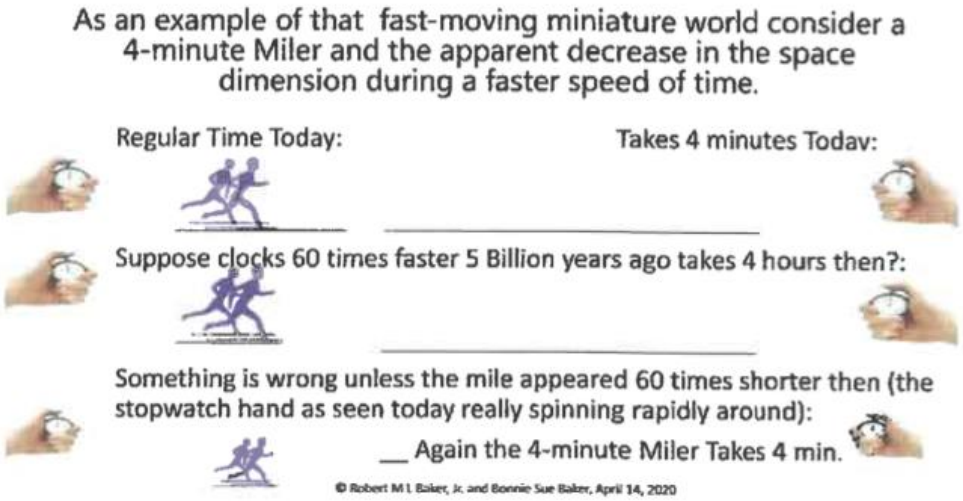

Figure 4. As a fictitious example of that fast-moving miniature world, consider a 4-minute miler and the apparent decrease in the space dimension during a time interval in which time (the stopwatch) is apparently moving faster.

discussed if somehow the events in 2007 were viewed from 2009.5, then the scene would show a slightly fast-moving stopwatch measuring a slightly fast moving runner and a slightly shorter mile track. Measurements of the Muon decay time there would not involve the shrinking of any dimension and might show a slightly longer Muon decay time (more movement of the stopwatch hand during the decay process). In any event, the fictitious example of -47,200 ps per year ps per year for a4-minute miler as viewed 5 billion years ago, the -13 ps per year for Muon decay more recently determined and the notional Figure 3 seem reasonable. That is, the speed of time variation shown conceptually in Figure 3, is much faster in the past (hypothetical -47,200 ps per year) than at the more recent time (-13 ps per year) as exhibited on the curve on this very hypothetical plot. The speed of time would appear to be slowing down.

In order to have the speed of light the same in all time frames of reference, as underlies the theory of special relativity, dimensions (such as the mile _____) must be shorter if the speed of time is faster, as in Figure 5.

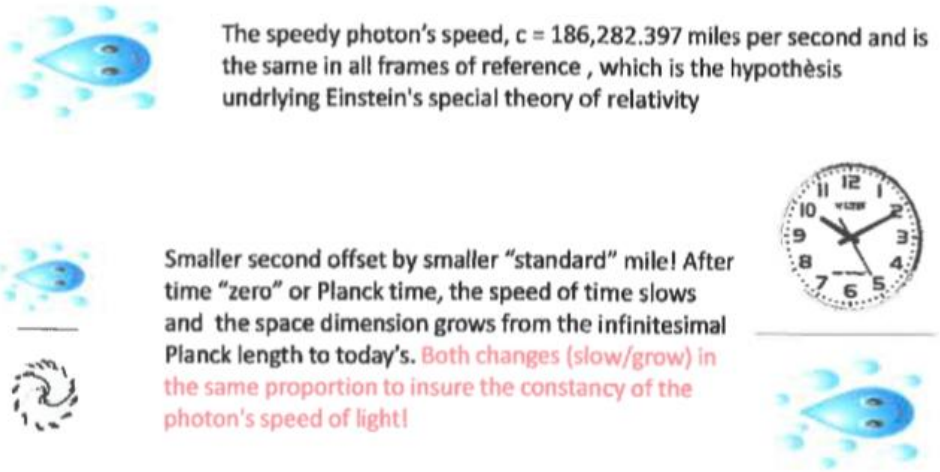

Figure 5. The speed of light is the same in all frames of reference.

At the beginning of our Universe the (change in the space dimensions) divided by the (change in the speed of time) equals (zero to the Planck Length during Planck Time)/(zero to Planck Time during Planck Time), which by the definition of Planck Time, equals the (speed of light). It is speculated that this **Fundamental Equation** (2) is correct at the beginning of our Universe:

$$\textbf{(change in the space dimensions)} = \textbf{(speed of light) x (change in the speed of time)} \quad (2)$$

Equation (2) can be rearranged as:

$$\textbf{(change in the space dimensions)/(change in the speed of time)} = \textbf{(speed of light)} \quad (3)$$

Applying Equation (3) to the beginning of our Universe is interpreted as meaning that initially spacetime moves out at the speed of light. Also of great importance is that this **Fundamental Equation** (2) shows that the speed of time and the space dimensions move out in concert. As our Universe progresses, the change in a space dimension is inversely proportional to the speed of time change according to an extension of the **Fundamental Equation** (2) to all times.

As we look back in time the space dimensions are smaller while the speed of time is greater as shown in the left-hand side of Figure 2, that is, the little galaxy is smaller and the clock runs faster. In the fictitious example of the 4-minute miler viewed five billion years ago, having a 60 minute per minute increased speed of time. We utilize the nomenclature of Equation (1), but the event or activity is considered to be a stopwatch. At time A (five billion years ago) we view a 60-second stopwatch (that is, the hand completes a complete circle in 60 seconds). We see it move the 60 seconds (we defined this as time A) whereas our stopwatch here and now moves

only one second (we defined this as time B). So time B divided by time A is the 60 second per second speed of time indicated in Figure 4. The apparent length of the "little" mile is time A divided by time B (1/60th) of a mile as viewed today looking at the 5-billion-year-old scene! A 6-foot-tall runner would appear to be (time A/time B) x 6 ft = 6/60 = 1/10th of a foot tall. His 2-foot-wide shoulders 2/60 = 1/30th of a foot wide, his track shoes likewise shorter. So all three space dimensions are reduced proportionately as the time speed increases. Next let us consider the Muon decay time example. From [8] we find that at time A (2009.5) it required 2,196,980.3 ps for the activity of Muon decay to take place, whereas at time B (2007) it required 2,197,013 ps (remember we are looking backwards at past times). Therefore, time B/time A = 1.000,015, which shows the slightly higher speed of time in 2007. That is, the hand of the stopwatch at time B (2007), which measures the duration of Muon decay at time B, had moved slightly further than the hand of stopwatch at time A (2009.5). With regard to dimensions, a 72-inch person at time B (2007) would apparently measure 0.999985 x 72 inches = 71.998892 inches as viewed in 2009.5. Of course, it is totally impossible to view 2007 from 2009.5—there is no time machine. Remember, also, that at both time A and time B the person would measure exactly 72 inches tall as usual—not a billionth of an inch differently!

During observations of our Universe: distant galaxies fly away from us faster than closer galaxies, and the Hubble constant tells us how fast that is. This might be directly related to the change in the speed of time. As time increases, the rate of its change could be erratic as shown in Figure 3, that is although in general it slows (rate of time slows approaching zero at the end of time), its rate of change, time frame to time frame, could decelerate, pause or perhaps accelerate (speed of time increasing) for a while since there is no apriori reason for constancy. This is like the movie camera's variable frame rate discussed in the Introduction.

At the beginning of our Universe the "change in the space dimension" of Equations (2) and (3) does not imply that one can measure a dimension or time intervals during the initial Planck-Time "interval" because conventional physical laws no longer apply and Euclidian Geometry is completely distorted. It simply means that it represents the dimensional change from a "time zero" epoch to Planck Time at which point physical laws begin to have meaning.

We look back in time several billion years—in actuality, as pointed out in the Introduction, we do this when telescopes look at stars billions of light-years away! We may see a galaxy via 5-billion-year-old photons: It appears to be rotating faster and a little less spread out than expected. Next, we look at an Olympics Games Coliseum on a duplicate Earth (we are pretending here—a thought experiment or Gedanken experiment as shown in Figure 6). There we see a little track with little runners going around—Wow! They make 4 circuits (a mile) in a few seconds by my wristwatch! Everything a little faster and a little smaller or less spread out like the galaxy! Now I look at the weight-lifting pavilion, like the fictitious filming in the Introduction. There are little weight lifters also moving quickly and pushing up little bar bells. Just like the discussion in the Introduction, the laws of physics appear to be as usual to them—a fast-moving miniature World with objects getting closer together—density of our Universe increasing as we go further back in time! But densities of the barbells and their gravitational fields and obedience to Schrodinger's equation, the laws of general relativity (e.g., including proper time) are unchanged! The scenes will have a reddish hue due to the Doppler Effect.

The influence of the Doppler Effect is interesting. Please consider a classical explanation of the Effect: While sitting in a train station you hear a high-pitch sound of an approaching train whistle. As sound waves essentially pile up after leaving the approaching train, whistle and wavelengths shorten, the whistle frequency apparently increases. As the train leaves the station, the sound waves get longer and longer and their frequency decreases. However, this change in the "signal" or whistle frequency has nothing

Figure 6. A fast moving miniature "World".

whatsoever to do with the mechanism the whistle! Therefore the Doppler Effect has nothing whatsoever to do with the "mechanism" of the scene portrayed by the time

frame. This same concept applies to gravitational time dilation as photons from a Scene or "frame" pass through gravitational fields on their way to your eyeball.

Figure 7 exhibits graphically the Rollout Theory with the speculated decrease in the rate or speed of time and its extremely short "years" in the early universe. Years then seem like seconds or microseconds (or even shorter, extremely close to the beginning of our Universe) as viewed today!

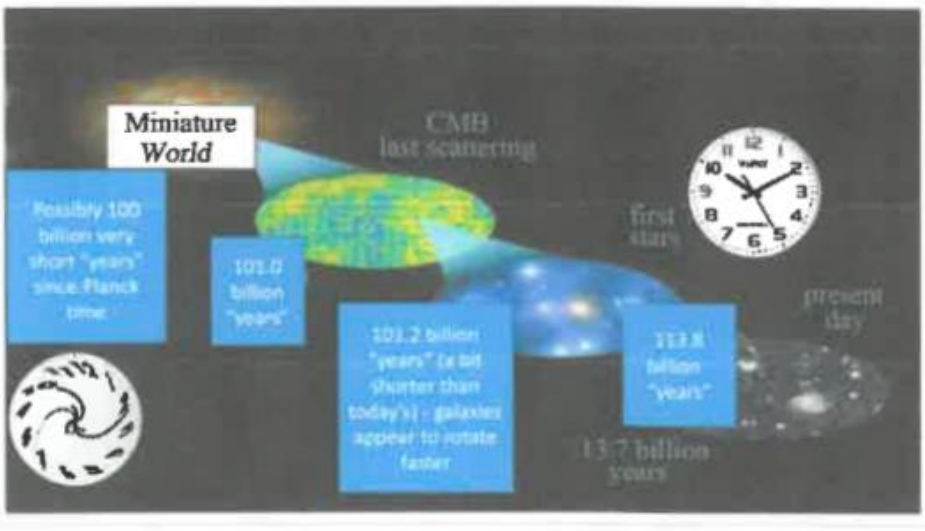

Figure 7. The growth of our Universe in local "years" that can appear today to be very short.

New mysteries: How does the speed of time vary with time itself and is there a detailed structure to that change? Does the speed of time change depend upon location and "surroundings" in our Universe (e.g., is it unique to the Earth or our Galaxy, or to change with the density of local matter, etc.) and if so what is the relationship? What is the actual theory for the change of the speed of time, that is, what is its cause? [8].

Is there a perfect clock or some kind of "absolute time"? The answer is “no." As Gyorgy Buzsaki and Rodolfo Llinas [9] in their article on "Space and time in the

brain," state "... neither clocks nor brains make time per se." As was discussed in [8], Muon decay might have its own kind of "time" so one might consider Muon decay time, itself as some kind of a clock—e.g., an alarm clock. The problem is you cannot "read" it. If you ask a chef "When will the bread being baked be ready?" She might reply "I don't know exactly." I would ask then, "How do you know when it is finished and take it out of the oven?" the chef might reply "I stick a toothpick in it and if some dough no longer sticks to it, then its cooking process is over, but I do not know exactly when that will hap-pen. I cannot read it like a clock you know!" In the context of the light cones described in Chapter 2 of [10] concerning the "arrow of time" or Entropy, there is the impossibility of distributing "polling-place clocks," which have exactly "polling-place" or absolute time, due to the special and general relativity effects as they are transported to various locations. Even if we attempt to set them by a radio signal, since we have imperfect knowledge of the speed of light (and no exact location because of Heisenberg's position uncertainty), it is impossible to accomplish the setting exactly. **Time is really relative!**

A more important question is what is the reference frame for time and its rate of change? Let us suppose that you are on a boat and someone asks: "Where are we and how fast are we are going?" Also suppose you do not have GPS so you say: "I can only tell you where we are how fast we are going relative to something!" So you see a leaf nearby and say: "... well with my stop watch and yardstick I can measure that leafs' motion as we go by it and tell you my speed relative to it—of course, the leafs actual location on our planet, and our planet's actual location in our Universe is unknown to me. Also the leaf may have its own speed relative to the water—but that is *the best estimate that I have".* Therefore, the only reference for time and the rate of time that we have is the clock on the wall and since, as I just suggested, there is no absolute time, so the clock on the wall "... *is the best estimate that I have*!" This dialog is similar to the answer you make when someone asks: "How is your wife?" The answer of course, is: "Compared to what?"

4. Conclusion

The fundamental equation, which when extended inversely relates the growth of the space dimensions to the slowdown of the speed of time at the beginning of Our Universe, is the key to the Theory of Our Universe or Rollout Theory. The Hubble

"constant" measurements may provide a means to validate this Theory since this Hubble "constant" we believe to be essentially the separation speed of cosmic objects due to the speed of time and growth of dimensions. The Cosmic Microwave Background (CMB) occurred about 400,000 years (in length of to-day's apparent, observed years) after the beginning of our Universe, so that we would see separation motion of the cosmos commensurate with the speed of time then. Specifically, 6.75 ± 0.05 x 10^4 m/s per Mpc [11]. Several billion years (again today's years and seconds) after the beginning of our Universe it was measured as 7.4 ± 1.5 x 10^4 m/s per Mpc [12]. No "Dark Energy" need be assumed. The average of these two measurements is 7.07 x 10^4 m/s per Mpc. As Viktor Toth [13] points out this average "...can be expressed in terms of inverse seconds, since a megaparsec is just about 30.9 million trillion kilometers; substitute and let the length units cancel, take the inverse, and you find that the Hubble parameter is the reciprocal of about 4.4 x 10^{17} seconds (-13.8 billion, apparent, years, about the age of our Universe) ... Now this is exactly the way it should be in the absence of gravitation, in a universe expanding at a constant rate. ...which means that in the past, *the universe would have expanded faster* ..." If our interpretation of Troth's analyses is correct, then it may possibly serve to support the Rollout Theory. Analyses of Muon decay time [8] may also serve as a partial proof of the Rollout concept. In this case there is a working hypothesis that Muon decay time "...can be represented as clocks..." independent from those of our Universe. Roughly the Muon decay time's measurements, ***which should be a constant***, decreased from 1946 to 2017 from very roughly 2,330,000, ps to very roughly 2,110,000 ps. However, from 2007.0 to 2009.5 (the time A and time B discussed in the foregoing section) the more precise Muon decay time measurements exhibit a more accurate decrease in apparent Muon decay time change. If Muon decay time, like the fictitious 4-minute miler, is a "standard" marker for our Universe's time, then their time change represents the speed of time slowdown in our Universe "...of very approximately -13 ps per year." [8] from time A to time B. Also, the plot of Figure 3 should be accurately developed (no longer simply an inaccurate, notional, conceptual plot) by the continued collection of Muon-decay time observations. Such data would be added to the Table on p. 62 of [8] in order to improve the accuracy and extent of the speed of time estimate. Those specializing in the dynamics of galaxies should analyze their motion billions of years ago as resulting from the change in the speed of time (NOT resulting from dark matter). A tool for such an analysis could be differential correction (Sections 1.4.2, 5.7.2, 6.7.2 of [14]) using the change in the speed of time as the parameter or local constant. One could adjust that parameter by differential correction to match the observed motion of portions of a galaxy. However, the

absolutely final proof must await the development of high-frequency relic gravitational wave detectors sensitive to frequencies in the terahertz and higher gravitational-wave frequencies such as the Li-Baker [3] [4] [5]. According to Andrew W. Beckwith, Christian Corda and the author, such sensitivity would be important in the observation of the early universe at times less than a picosecond from our Universe's beginning, when this Rollout Theory predicts an extremely rapid (high frequency) activity in our new Universe! ([15] [16] [17] [18] [19] and Chapter 10 of [10].

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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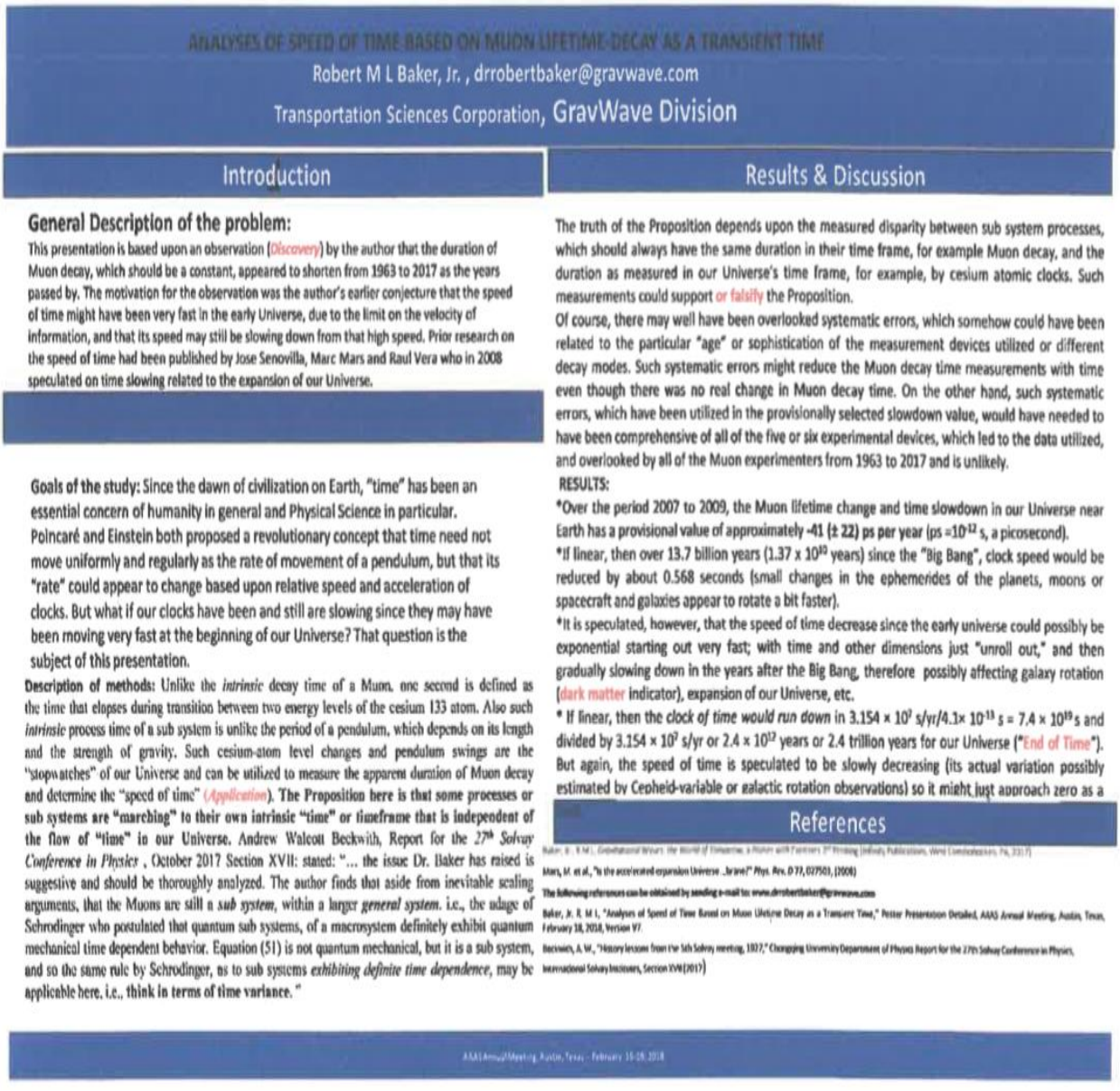
Supplementary Material

R. M L Baker, Jr. 2018, Invited Poster Presentation to the Annual Meeting of the *American Association for the Advancement of Science*, February 18.

Poster presented after session on Dark Matter Detectors



ANALYSES OF SPEED OF TIME BASED ON MUON LIFETIME-DECAY AS A TRANSIENT TIME

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Introduction

General Description of the problem:

This presentation is based upon an observation (Discovery) by the author that the duration of Muon decay, which should be a constant, appeared to shorten from 1963 to 2017 as the years passed by. The motivation for the observation was the author's earlier conjecture that the speed of time might have been very fast in the early Universe, due to the limit on the velocity of information, and that its speed may still be slowing down from that high speed. Prior research on the speed of time had been published by Jose Senovilla, Marc Mars and Raul Vera who in 2008 speculated on time slowing related to the expansion of our Universe.

Goals of the study: Since the dawn of civilization on Earth, "time" has been an essential concern of humanity in general and Physical Science in particular. Poincaré and Einstein both proposed a revolutionary concept that time need not move uniformly and regularly as the rate of movement of a pendulum, but that its "rate" could appear to change based upon relative speed and acceleration of clocks. But what if our clocks have been and still are slowing since they may have been moving very fast at the beginning of our Universe? That question is the subject of this presentation.

Description of methods: Unlike the *intrinsic* decay time of a Muon, one second is defined as the time that elapses during transition between two energy levels of the cesium 133 atom. Also such *intrinsic* process time of a sub system is unlike the period of a pendulum, which depends on its length and the strength of gravity. Such cesium-atom level changes and pendulum swings are the "stopwatches" of our Universe and can be utilized to measure the apparent duration of Muon decay and determine the "speed of time" (Application). **The Proposition here is that some processes or sub systems are "marching" to their own intrinsic "time" or timeframe that is independent of the flow of "time" in our Universe.** Andrew Walcott Beckwith, Report for the 27th *Solvay Conference in Physics* , October 2017 Section XVII: stated: "... the issue Dr. Baker has raised is suggestive and should be thoroughly analyzed. The author finds that aside from inevitable scaling arguments, that the Muons are still a *sub system*, within a larger *general system*. i.e., the adage of Schrodinger who postulated that quantum sub systems, of a macrosystem definitely exhibit quantum mechanical time dependent behavior. Equation (51) is not quantum mechanical, but it is a sub system, and so the same rule by Schrodinger, as to sub systems *exhibiting definite time dependence*, may be applicable here, i.e., think in terms of time variance."

Results & Discussion

The truth of the Proposition depends upon the measured disparity between sub system processes, which should always have the same duration in their time frame, for example Muon decay, and the duration as measured in our Universe's time frame, for example, by cesium atomic clocks. Such measurements could support or falsify the Proposition.

Of course, there may well have been overlooked systematic errors, which somehow could have been related to the particular "age" or sophistication of the measurement devices utilized or different decay modes. Such systematic errors might reduce the Muon decay time measurements with time even though there was no real change in Muon decay time. On the other hand, such systematic errors, which have been utilized in the provisionally selected slowdown value, would have needed to have been comprehensive of all of the five or six experimental devices, which led to the data utilized, and overlooked by all of the Muon experimenters from 1963 to 2017 and is unlikely.

RESULTS:

*Over the period 2007 to 2009, the Muon lifetime change and time slowdown in our Universe near Earth has a provisional value of approximately -41 (± 22) ps per year (ps =10^{-12} s, a picosecond).

*If linear, then over 13.7 billion years (1.37 x 10^{10} years) since the "Big Bang", clock speed would be reduced by about 0.568 seconds (small changes in the ephemerides of the planets, moons or spacecraft and galaxies appear to rotate a bit faster).

*It is speculated, however, that the speed of time decrease since the early universe could possibly be exponential starting out very fast; with time and other dimensions just "unroll out," and then gradually slowing down in the years after the Big Bang, therefore possibly affecting galaxy rotation (dark matter indicator), expansion of our Universe, etc.

* If linear, then the *clock of time would run down* in 3.154 × 10^7 s/yr/4.1× 10^{-11} s = 7.4 × 10^{19} s and divided by 3.154 × 10^7 s/yr or 2.4 × 10^{12} years or 2.4 trillion years for our Universe ("End of Time"). But again, the speed of time is speculated to be slowly decreasing (its actual variation possibly estimated by Cepheid-variable or galactic rotation observations) so it might just approach zero as a

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The following references can be obtained by sending e-mail to: www.drrobertbaker@gravwave.com

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AAAS Annual Meeting, Austin, Texas - February 16-20, 2018

Viktor T., Toth, 2020, *Quora*, June 7

Viktor T. Toth,

IT pro, part-time physicist

Is it a coincidence that if the Hubble constant has an average of 701un/MP (67km and 73km respectively) then 13.8B LYs of space will expand exactly at light speed, same as its age?

You stumbled upon one of the great unresolved questions in physical cosmology. The age of the universe is 13.8 billion years, give or take, or about 4.4×10^{17} seconds.

The Hubble parameter, which has a value of roughly 70 km/s/Mpc, can be expressed in terms of inverse seconds, since a megaparsec is just about 30.9 million trillion kilometers; substitute and let the length units cancel, take the inverse, and you find that the Hubble parameter is the reciprocal of about 4.4×10^{17} seconds.

Now this is exactly the way it should be in the absence of gravitation, in a universe expanding at a constant rate. But that is not our universe. It has gravitation. Gravitation that would normally slow down the expansion over time; which means that in the past, the universe would have expanded faster, hence it would be younger. Except, of course, that we now also have dark energy, which has been dominating the rate of expansion for the past 5 billion years or so, and its effect is to accelerate the expansion. These two effects seem to cancel each other out almost to perfection, and we end up with this strange coincidence that to = 1/Ho.

Now I should mention that in an accelerating universe, this really only hap-pens once in that universe's lifetime. A few billion years ago, the universe would have been younger than the inverse of the Hubble parameter's value back then. A few billion years from now, it will be much older. It is only in the present epoch in the accelerating universe that the two numbers coincide. Just how likely is it that we live precisely in this epoch? Not a couple of billion years too soon or too late for this coincidence to happen?

No one really knows the answer. It could simply be a coincidence. Sometimes?

The Alexandra Witze, Webb Space Telescope Article Possible Support for the *Rollout Theory of Our Universe*

September 2022

The Alexandra Witze, *Webb Space Telescope* Article (*Nature*, **608**. August 4, 2022) may include observational proof of the *Rollout Theory of Our Universe*.

The *Theory* states that *time*, like the other three dimensions of spacetime, involves movement and the speed of that movement (please see second attachment). *Time* in the past, nearer to the beginning of our Universe, was moving faster than it is today. So, the galaxies APPEAR to rotate faster in the past than they do today, without need for dark matter to hold galaxies together. Also, the years appear shorter and the age of our Universe much longer, so that star and galaxy formation appear more quickly. The dimensions of space also start off small and increase so the size of galaxies appear smaller near the beginning of our Universe and increases with time The speed of time is gradually decreasing as one moves away from the center of our Universe and toward our Solar System, therefore we would also see the gradually increasing redshift of stars without any need for them to be increasing their separation speed or accelerating and no need for the invention of dark energy. Astronomers are essentially looking at a "movie" with a varying frame rate, much faster near the Universe's beginning and slowing nearer to our Earth. Very near the beginning of the Universe time is moving extremely fast so there is an *extreme red shift* to the microwave end of the spectra of the receding stars nearer to our Universe's beginning and could be the source of the Cosmic Microwave Background. If astronomers viewed instead a Physics laboratory, then the experiments would always yield the same result, but might APPEAR to move faster – technicians apparently running around and all experimental devices moving apparently fast, but with the same results for the technicians at the time. Therefore, the laws of Physics are invariant relative to the camera frame rate or the local speed of time in the *Rollout Theory*.

Possible Witze Article (*Nature*, **608**. August 4, 2022) Specific **Support for the Rollout Theory:**

Page 18:

"The fact that we found these two bright galaxies (so near the beginning) of our Universe was really a surprise," says Marco Castellano. …"

No surprise at all if our Universe started much earlier as the Rollout Theory suggests.

Page 19:

"With the resolution of James Webb, we able to see that galaxies have disks way earlier than we thought they did, "says Allison Kirkpatrick "… that's a problem" she says,". because it contradicts earlier theories of galaxy evolution."

No contradiction at all.

The Universe started much earlier as the Rollout Theory suggests that massive galaxies formed earlier in the Universe than was thought. A team led by Ivo Labbe at the Swinburne University of Technology in Melbourne, Australia, reports finding 7 huge galaxies in the CEERS field, with redshifts between 7 and 10. "Massive galaxy formation began extremely early in the history of the Universe," the scientists write.

No surprise at all since our Universe started much earlier as the Rollout Theory suggests.

"Closer galaxies (closer to the beginning of our Universe) are smaller than expected".

This is exactly what the Rollout Theory predicts!

Possible pre Webb Space Telescope Literature Support for the Rollout Theory:

There have been a few past articles concerning galaxies whose comments might be consistent with the *Rollout Theory:*

1. "But the findings clash with the measurement of how fast the galaxies are flying apart from each other and predict that the Universe should be expanding at a significantly slower pace than is currently observed." That is, the Universe is

expanding FASTER than expected!!! Davide Castelvecchio (Nature, 23 July 2020, pp. 500-501).

2. Adam Riess (Johns Hopkins University, Baltimore, Maryland) says "… that perhaps it is cosmology's standard model that is wrong instead… my gut feeling is that there is something interesting going on." could that something "interesting" just possibly be the *Rollout Theory* of our Universe? Dr. Riess' remarks are reported in same Nature issue as above.

3. "We conclude that massive bulges and regularly rotating disks can form more rapidly in the early Universe than predicted by models of galaxy formation." Federico Lelli, et al., Science, 12 February 2021.

4. "This finding suggests that processes that generate the key features of a mature galaxy (~12.5 billion years ago) arose more rapidly than has been thought." (Julie Wardlow, same issue pp. 674-675).

5 "Observations have established that the total star-formation rate in the Universe rose steeply after the Big Bang, reached a peak at redshift z between 1.5 and 3, and have declined steadily since then." And (same page third column): "A steeply rising, and/or constant velocity curve has been measured in another high redshift (faraway) galaxies". Tsukui and Iguchi, in: "Spiral morphology in an intensely star forming disk galaxy more than 12 billion years ago" (Nature 11 June 2021, Vol. **372**, Issue 6547, pp. 1201-1204. That is consistent with the speed of time slowing as the *Rollout Theory* predicts!
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6. "Together with earlier spectroscopic data for MACS1149-JD1, our analysis of this enlarged sample provides further support for a cosmic star formation history extending beyond redshifts $z \simeq 10$." In "Probing cosmic dawn: Ages and star formation histories of candidate $z \geq 9$ galaxies" N. Laporte, R. A. Meyer, R. S. Ellis, B. E. Robertson, J. Chisholm, G. W. Roberts-Borsani Monthly Notices of the Royal Astronomical Society, Volume **505,** Issue 3, August 2021, Pages 3336–3346). The apparent higher "speed" of star formation and recessional speed of celestial objects are both compatible with the higher speed of time "near" the beginning of our Universe (i.e., higher redshifts) suggested by the *Rollout Theory*. Of course, "compatibility" is not "proof" of a theory but merely adds credibility to it!

These six articles seem to suggest that galaxies were going and star formation growing faster and galaxies appearing smaller in the past than originally estimated by utilizing cosmology's standard model. The *Rollout Theory* states that these apparent effects are the result of the increased speed of time back then and **NO**, **so far undetectable, dark matter or energy are required.**

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REVIEWER's Comments on Paper ID 7504352:

Detection and Determination of the Variation of the Speed of Time

By Robert M L Baker, Jr. Bonnie S. Baker and Fangyu Li

p. 1, Might consider renaming to "the spatial dependence of the flow of time"

p. 4, Line 12, not the first measurement as next sentence indicates

Line 13, Consider re-ordering and rewording

Line 14, Consider re-ordering and rewording

p. 6, Table 1. Recommend removing highlighting unless a key or legend is added

p. 8, Lines 8, 9 and 10, Exclamation marks are no longer used in academic papers

This statement seems to defeat your premise so I would recommend you delete it

p. 9, I'm not sure a broken clock would be preferred by Occam's razor – you might want to delete this part. The rollout may be slowing for other reasons, e.g. finer grain expressions of entropy variations

p. 14, Line 4, Not really a mistake, but needs to be accounted for

p. 18, Line 3, I like this analogy but who among use remembers what a round house is?

p. 20, Line -11 ? 10^{-12}

Line 16, please recalculate

p. 21. Last Line I suppose it is OK for Muons to use explanation marks, even in scientific papers

p. 25. Last Paragraph Isn't the point that there are NOT sync'ing with variations elsewhere in the universe?

Aren't these NVRT? If so consider rewording sentence

p. 26. Last 6 Lines. This is repetitive in that you've already given this analogy; consider deleting

p. 27. Last 3 Linea. What is the measurable process P(t) in this case?

Conclusions: I recommend publishing this paper because it adds actual observational data to corroborate their suggested working hypothesis concerning our Universe, which may well be a stunning replacement for the standard cosmological model. Their concept of Non-Varying-Rate-of-Time (NVRT) processes might substantially impact our basic understanding of Particle Physics.

Detection and Determination of the Variation of the Speed of Time

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Abstract

e is involved in most scientific
mensions in spacetime we
be a variation rate of time's
me in the time dimension. We
riation observational data in
decay, galaxy rotation
·) and the separation speed of
Universe progresses (related
f these processes will have an

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"observed value" of their time of completion P_o from an observation of the process at time t_1 and an "expected value" P_e of that time at time t_2. Their difference is attributed to the variation of the speed of time. We provide a possible explanation for the anomalous separation of the observed and the expected galactic velocity curves. Our conclusion is that it is unnecessary to introduce dark matter or dark energy.

Keywords

Early Universe, High-Frequency Gravitational Waves, High-Frequency Relic Gravitational Waves, Primordial Gravitational Waves, Cosmology, Speed of Time, Dark Matter, Dark Energy, Galactic Velocity Curves

1. Introduction

We believe that although time, as a steadily increasing independent variable, is involved in almost all scientific analyses, time's rate of change (speed of time) and the variation of that speed should also be involved. We suggest that time, like the motion of objects moving in the three space dimensions, can increase or decrease at a variable rate. Similar to the hands of a watch moving fast or slow, this change in the speed of time could be almost trivially small or very large. In the standard cosmological model, the early universe was very smooth (homogeneous), but we suggest that since the beginning of our Universe entropy's evolution should be inhomogeneous, that is the rate of entropy increase cannot be uniform. Because the direction of the time arrow depends on the "direction" of entropy increase, the speed of time should also depend on the "speed" of entropy

increase. In this case, if the entropy of the whole Universe has been increasing and entropy's speed is slowing down, then the speed of time is also slowing down! Here we apply the speed-of-time concept to observational data concerning three different physical processes: muon decay time, the rotational speed of the observable portions of a galaxy (related to dark matter) and the separation speed of celestial-objects as our Universe progresses (related to dark energy).

We also suggest that the detection of High-Frequency Gravitational Waves (HFGWs) is an essential observational tool for examining the speed-of-time concept:

1) Unlike the low-frequency gravitational waves (e.g., the gravitational waves generated by the merger of black holes or neutron stars) HFGWs are generated less than a nanosecond after the beginning of our Universe. We believe these primordial or relic HFGWs were generated by processes occurring when the speed of time in our early Universe was extremely fast.

2) Today almost all mainstream cosmological inflation models expect that the upper limit of the frequencies of primordial HFGWs should be GHz or higher. This means that the period of the primordial HFGWs is about 10^{-9} seconds or less. That time may be about the time necessary to complete an oscillation or essentially the time to complete some activity or process in our early Universe.

3) We contend that primordial or relic HFGWs were propagated before our Universe became transparent to electromagnetic radiation. If such primordial HFGWs can be detected by the HFGW detector, discussed in connection with our analyses of Muon decay, then their observations may not only contain information on the speed of time, but information, gained by means of the analyses of the HFGW frequency spectrum produced by the processes themselves.

4) In the future detection of primordial high-frequency gravitational waves, it seems necessary to distinguish what is the increase of the wavelength of the primordial gravitational waves due to the possible expansion of the Universe (*i.e.*, the decrease of the frequency), and what is the decrease of the frequency due to the decrease of the speed of time, as our Universe ages. This determination may not only be a challenge, but also an important opportunity in the study of cosmology.

5) The observed speed of the stars comprising the periphery of nearby galaxies can be overestimated. Such an overestimates may be caused by the Doppler observation of stars beyond in spacetime the galaxy being miss-associated to be an actual peripheral galactic star. Since a star beyond the nearby galaxy would be further from the Earth than the galaxy and closer to the beginning of our Universe, they would be in a spacetime region of higher time speed and therefore higher apparent star speed relative to the observer on our Earth. Thus we may be fooled into associating them with the galactic stars and thereby overestimating the observational average speed of the peripheral galactic stars.

We will also discuss processes that do not depend internally on the three space dimensions and are independent of the time-varying flow of time in our Universe. We call them Non-Varying-Rate-of-Time (NVRT) processes and suggest muon decay as an example of a NVRT process.

Most processes depend upon various parameters and variables, such as a, b, c… and time, but here we single out time as the variable of interest. We propose that the best way to determine the speed of time is to compare the same physical process at two different times. Each process, P, will have an "observed value" of the process' time of completion, P_o, from an observation of the process at time t_1 and an "expected value" of P_e as the process time is

expected to be at another time t_2. Time t_2 is usually considered in this discussion to be a time in the past when the photons left the process *P*. Or in the case of muon decay, when the process time, P_0 was obtained and recorded in the past at a time t_1. If time is not progressing steadily and uniformly, then we attribute any variation of the expected Process $P_e(t_2)$ time from the Process time we actually observe or actually record, $P_o(t_1)$, to a variation of the speed of time. The fundamental equation relating $P_o(t_1)$ and $P_e(t_2)$ to determine the variation of the speed of time, V_{st}, is:

$$V_{st} = \left[P_o(t_1) - P_e(t_2) \right] / (t_1 - t_2) . \quad (1)$$

If the observed time for a single cycle or for the completion of a Process, P_o, is exactly the same as the expected time for such a process, P_e, then time running smoothly with no variation, in which case the Variation of the Speed of time is zero.

The Processes of interest and our expectations for them are:

1) The expected duration of muon decay at t_2, $P_e(t_2)$, is equal to the last measured value of muon decay time in picoseconds, at t_1.

2) The inverse of the expected speed of a portion of the visible disk of a galaxy at t_2, $P_e(t_2)$, in seconds as based upon conventional Astrodynamics [1] [2]

3) The expected value of the speed of separation of a celestial object at t_2, $P_e(t_2)$, is established by a "proposed" expansion theory of our Universe, here taken to be that the separation speed should be the same everywhere in our Universe (also that the Hubble "constant" is approximately 70 km/s per Mpc or 2×10^{-18} [m/s per meter] or approximately $1/5 \times 10^{17}$ seconds) therefore we express the expected cosmic object's speed in fractions of the Hubble "constant" in seconds, to be equal everywhere in our Universe.

2. Muon Decay Time to Measure the Variation of the Speed of Time

The most accurate time measurements of Process time in a laboratory on Earth were found to be the decay time of Muon's as measured by atomic or nuclear clocks. Muons are produced when cosmic rays strike atomic nuclei of molecules in the air and quickly decay over a fixed time interval. Muons can also be produced in a two-step process at large research facilities. High energy protons (>500 MeV) generated by a particle accelerator collide into a carbon or beryllium target and generate Muons.

The earliest measurement of muon decay time that we found was made in 1946 of 2,330,000 ps [3]. A more accurate measurement of muon-decay time found was 2,202,000 picoseconds (ps) by Eckhause, *et al.* in 1963 as part of the Olive, Particle Data Group [4] findings. The most accurate muon-decay time found so far was made by Webber and a group called the *MuLan Collaboration* in 2011 of 2,196,980 ps [5].

After further search of the literature a mysterious trend appeared: the duration of muon decay, which should be a constant, appears to shorten gradually, perhaps irregularly (including pauses and acceleration or lengthening), from 1946 to 2017 from very roughly 2.330 microseconds (1946) to very roughly 2.202 microseconds (1962-1963) by Lindy [6] and could be a basis for the detection and determination of the variation of the speed of time effect in laboratories on Earth independent of relativistic effects, that is if it is found that the shortening of muon decay time continues to be observed.

All of these observable data are exhibited in **Table 1** and graphed in **Figure 1**.

The 1946 *Conversi*, *et al.* measurement's estimated error was so large as to be eliminated,

except as Clive Woods suggested, "… that if outliers were eliminated, then any possible trend might be masked." Therefore, if we include the 1946 *Conversi*, *et al.* measurement, we take the decay-time difference between both

Table 1. Review of length of apparent muon decay time versus time.

Date of Measurement	Apparent Muon Decay Time (Picoseconds)	Estimated Error (Picoseconds)	Muons at Rest or in high-speed Cosmic-ray generated Motion?	Reference
1946.0	2,330,000	±150,000	At Rest	Conversi, Pancini, Piccioni [3]
1962.0	2,203,000	±4000	At Rest	Lindy [6]
1963.0	2,202,000	±3000	At Rest	Eckhause, *et al.* [4]
1973.0	2,197,300	±300	At Rest	Duclos in Olive. [4]
1974.0	2,197,110	±80	At Rest	Balandin in Olive. [4]
1984.0	2,196,950	±60	At Rest	Giovanetti in Olive. [4]
1984.0	2,197,078	±73	At Rest	Bardin in Olive. [4]
2007.0	2,197,013	±21	At Rest	Chitwood in Olive. [4]
2008.0	2,197,083	±32	At Rest	Barczyk in Olive. [4]
2008.5	2,197,030	± 40	At Rest	Coan & Ye in Olive [4]

2009.5	2,196,980.3	±2.2	At Rest	Webber/MuLan [5]
2013.0	2,196,980.3	±2	At Rest; a copy of 2009.5 measurement	Tischchenko [7]
2015.02	2,110,000	±70,000	Fast, Cosmic Ray	Barazandeh [8]
2015.02	2,165,000	±403,000	Fast, Cosmic Ray	Barazandeh [8]
2016.0	2,078,000	±11,000	At Rest	Physics OpenLab [9]
2017.0	2,080,000	± 11,000	At Rest	Adams [10]

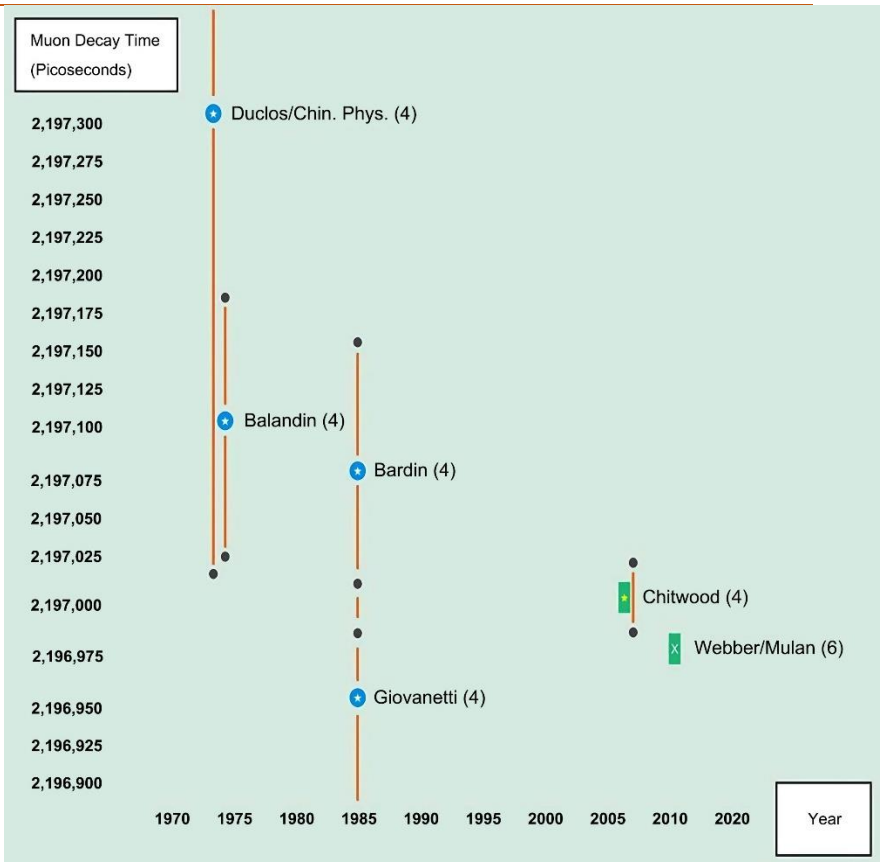

Figure 1. Data from **Table 1** and Fig. 1a, page 63 of [1]).

outliers, with P_e = 2,330,000 ps (we expect it to be exactly as measured most recently) and P_o =

2,080,000 ps (most recent 2017 measurement) over the time interval of $t_2 - t_1$ = 2017 − 1946 = 71 years, then the variation of the speed of time from Equation (1) would be

$$(2080000 - 2330000)/71 = -3521 \text{ ps/year}. \quad (1a)$$

If the outliers are eliminated and only the more accurate MuLan data utilize, then P_e = 2,197,013 ps [4] and P_o = 2,196,980.3 ps [5] over the time interval of $t_2 - t_1 = 2009.5 - 2007 = 2.5$ years, then the variation of the speed of time from Equation (1) would be

$$(2196980.3 - 2197013)/2.5 = -13 \text{ ps/year}. \quad (1b)$$

In any event, the **Table 1** exhibits most of the more accurate muon-decay times found and their estimated error. We recognize that the slowdown of clocks in ps per year, probably itself decreases or increases as time increases. Therefore, there may have been an actual "accelerated or decelerated slowdown" after the beginning of our Universe! However prior to this analysis, there was no a priori observational data of muon-decay time analyzed to indicate with certainty either a constant or a varying slowdown or speedup of the rate of time.

Under the supposition or working hypothesis that the aforementioned decrease in muon-decay time shortens as time increases, an interesting conjecture immerges: that the muon-decay process operates with a different "clock" or change in the speed of time, compared with the clock with which the rest of our Universe operates! Is there a possibility that muon decay has a clock that runs without variation at a fast or slower pace as time progresses? Under this assumption or working hypothesis the rate of slowdown of the time in our Universe is computed to be very roughly (not enough data to support a valid estimate of error) of between very approximately −13 ps per year (or -4.1×10^{-19} s/s) and −3500 ps per year (or -1.1×10^{-16} s/s) during the 71 year period

between 1946 and 2017. Since we have no other muon-decay times to analyze, we will make the provisional assumption that the muon-decay rate of time change in our Universe does not remain a constant, but becomes smaller as the time in our Universe increases! There are 2.2×10^9 seconds in 71 years so the rate of the assumed rate of change is $([3500 - 13] \times 10^{-12}$ seconds$)/2.2 \times 10^9$ seconds $= -1.6 \times 10^{-19}$ s/s. Therefore in this case, with the 71 years centered about 1981, or approximately 4.32×10^{17} seconds since the beginning of our Universe. These slowdowns per second over 71 years are very approximate and call for more Muon-decay measurements having higher accuracy as well as more data on muon-decay-time found from other past times.

Figure 2 is a Notional plot of the change in the speed of time variation as a

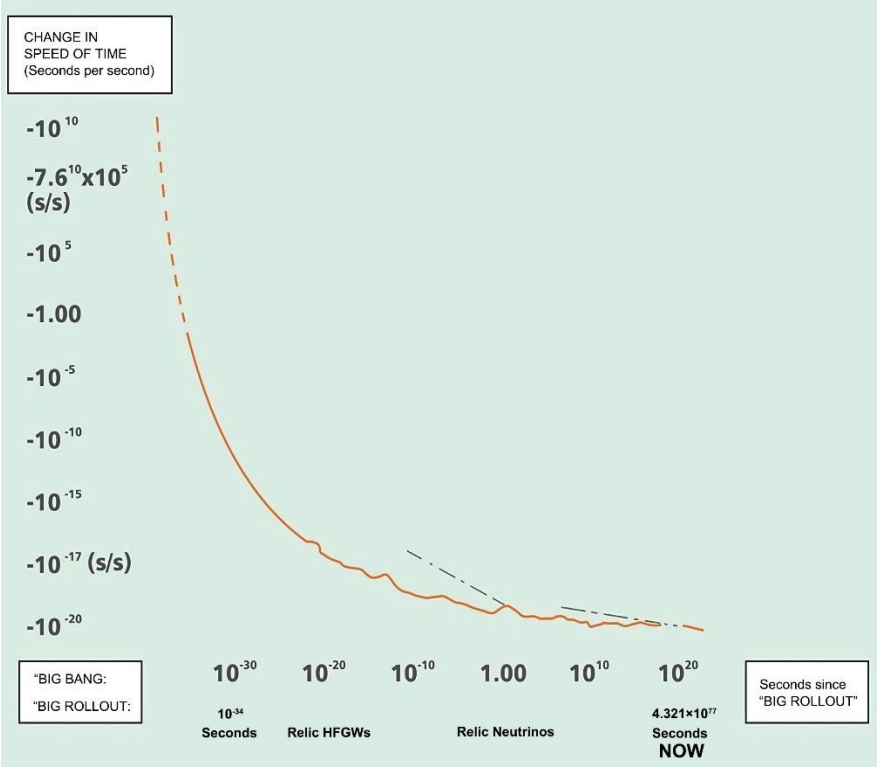

Figure 2. Notional graph from Fig. 3 of [11] of the change-of-speed-of-time variation with today's time dimension. The Figure is only a schematic

and not intended for detailed analyses. Notice different slopes (tangents) and irregularities and the current time rate of about 10^{-17} seconds per second between 10^{-15} and 10^{-20} seconds per second shown by the expanded graduation scale on the ordinate near the "BIG BANG" or "BIG ROLLOUT".

function of the time since the "Big Bang" or "Big Rollout" taken from Fig. 3 of [11]. It is only schematic and not intended for detailed analyses. The substantial increase in the speed of time value in the Notional and schematic graph of **Figure 2**, a nanosecond or less after the beginning of our Universe, is based upon our Rollout Theory of the beginning of our Universe and the high speed of time near the beginng of our Universe proposed by Baker [12]. The detection of High-Frequency Gravitational Waves (HFGWs) generated by processes occurring less than a nanosecond after the beginning of our Universe would provide the most important fundamental data for the formulation of a theory on the variation of the speed of time! The specific data points on the very approximate curve, quite close in time to our Universe's beginning would be disclosed by a study of the HFGWs emanating from the early Universe. Such a study could be obtained through utilization of the effect found by Li [13] and the Li-Baker HFGW Detector [14] as well as the analysis of the sensitivity and utilization of that Detector [15] [16] [17].

We assert that the Rollout Theory for our Universe [12] is simpler than some portions of the conventional Theory for the Big Bang: such as "...that the nascent Universe passed through a phase of exponential expansion soon after the Big Bang, driven by a positive vacuum energy density" (see Fig. 1 of [12]). Whereas the proposed Rollout Theory depends upon the simple concept that our Universe is similar to an ordinary clock or wristwatch that is slowing down as it ages,

therefore by Occam's razor the Rollout Theory is preferable.

Although it would not affect the correctness of the theorized Theory of our Universe [12], more accurate measurements of muon decay time are needed in order to actually calculate an accurate local variation of the speed of time on Earth or indicate that muon decay time does not change with time and does not have its own "clock." The speed of time and/or the speed of time's variation may well depend upon "where" one measures the variation on the fabric of spacetime and/or the local mass distribution of matter or some other feature of our Universe! There may be a number of alternatives to this slowing-of-time analysis, but since time slowing in our Universe has some bearing on two other processes to be considered in this study, we will continue with it.

3. Rotational Speed of a Portion of the Visible Disk of a Galaxy to Measure the Variation of the Speed of Time

If the rate of time was greater in the past (these observations come from photons produced by galaxies millions or billions of years ago), then galaxies would **appear** to us today, with our slower clocks, to be rotating faster just a**s** a watch in the past, if seen today, would appear to be moving its hands faster than our slower clocks as seen today as in **Figure 3**.

As discussed on pages 71-72 of [11] the galaxies do not rotate like a solid top. Rather the galactic stellar material rotates at different rates depending primarily upon their radial distance from the galaxy's center. In **Figure 4** the grey dashed line exhibits the magnitude of the vector velocity in kilometers per second of

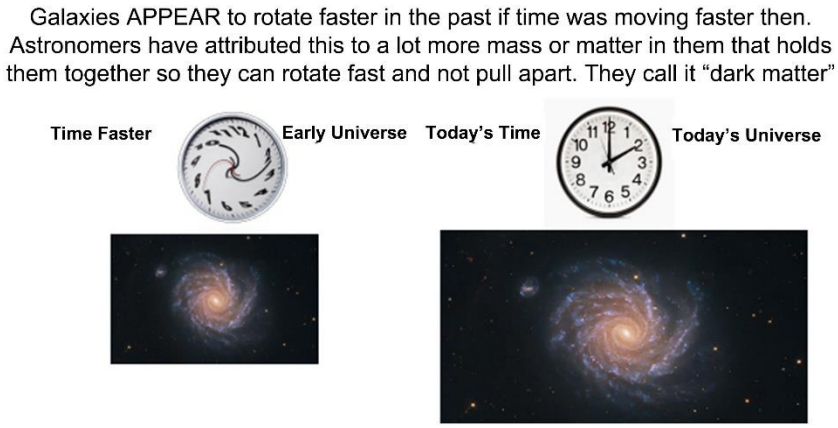

Figure 3. Rotational rate of galaxies.

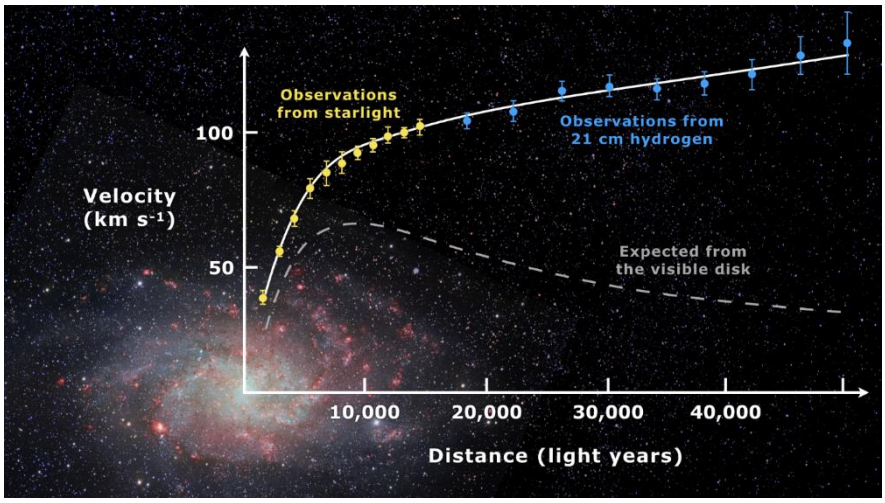

Figure 4. Typical galactic velocity curves. The upper-solid white-line curve is the observational data from galactic starlight (yellow data points) and radio-astronomy spectral analysis (blue data points) of the observed speed of galactic portions at various radial distances out from the galactic center of a typical galaxy such as Messier 33. The lower dashed-grey-line (speed) curves exhibit the expected speed, at the same radial distances, utilizing Astrodynamics [1] [2].

stars in the galactic disk. It is obtained by Astrodynamic analyses [1] [2] of various galactic

stars as a function of their radial distance in light years. The observed speed from the portion of the visible disk of a galaxy as measured from the Doppler Effect utilizing spectral data is shown by the solid white curve in **Figure 4**.

Consider the observational data for the galaxy, Messier 33, about 2.73 million light years away from the Earth as shown graphically in **Figure 4**. We will extract approximate values of the pertinent data from measurements of the drawing. This nearby galaxy is about the same distance from the beginning of our Universe as is the Earth. Consider a Doppler speed observation, P_o, of the luminous matter that shows the observed (by Doppler spectral analyses) tangential speed of "rotation" of a portion of the arms of the galaxy to be about 100 km/s at about 10,000 light years distant from the center of that galaxy. We will initially consider that distance from the galactic center for calculation since this observable part of a galaxy is moving at the maximum speed of galactic material approximately shown in **Figure 4**. The circumference of the assumed circular orbit of a galactic star (turns out to be a very poor assumption as will be discussed) at this 10,000 light year distance or 9.46×10^{16} km radius, is $2\pi \times 9.46 \times 10^{16}$ km = 5.94×10^{17} km. Therefore as observed, this requires 5.94×10^{17} km/(100 km/s) = 5.94×10^{15} seconds to complete one revolution or one orbital period of a star's circular orbit. The calculated and expected tangential speed, derived by applying conventional gravitational or Astrodynamic theory, is $(65/100) \times 5.94 \times 10^{15} = 3.86 \times 10^{15}$ seconds to complete one revolution or one orbital period. In order to compute Equation (1), we insert the difference between these two times and divide by the number of years for the

photons to reach the Earth, $t_1 - t_2 = -2.73\times10^6$ years. Therefore the speed of time change at this position on the galaxy is $\left(5.94\times10^{15} - 3.86\times10^{15}\right)/2.73\times10^6 = 6.52\times10^8$ seconds per year! Compared to muon-decay computed speed of time on the Earth, this is extremely large. As will be emphasized later, such an enormous speed of time is based upon a completely erroneous, although interesting, assumption of a circular galactic orbit and will be discarded. Furthermore, from **Figure 4**, the speed of time would appear to increase in a very anomalistic fashion, even more so out nearer the periphery of the Messier 33 galaxy! As will be discussed, due to an increase in the speed of time in the past and miss-associated "background" stars measured, there may well be an over estimate of the speed of the galactic stars and especially miss association of these distant in spacetime apparently fast-moving stars with the galactic star. Therefore in **Figure 4**, the upper solid line of observed Doppler-Effect observations could in actuality be much slower and closer, but might not overlap the lower estimated value of galactic rotational speed based upon conventional gravitational or Astrodynamic theory The speed of stars beyond the 40,000 light- year radius are no doubt unrelated to Messier 33 and are observed from our Earth as having higher apparent speeds as our universe rolls out. In this case, the actual 21-cm spectral-line-shift observational data of **Figure 4** show those apparent stellar speeds due to the predicated slowdown of time from very high speeds, on average approach about 150 km/s in the region of observable spacetime near Messier 33 and supports the new Rollout Theory [12].**

**To measure the rotation of a galaxy, observations must take into consideration the average shift of the spectrum of the galaxy. This will almost always result in a net spectral redshift for galactic stars, since it includes the expansion of the universe, and also our solar system's motion around the galaxy we are observing (the rotation of our planet, our orbit around the Sun, the Sun's motion around the galaxy, and the galaxy moving through the universe). The more rapidly the galaxy rotates the more the red shift. Distant stars in spacetime, further and older than a given galaxy, show a larger red shift the faster time is moving in their spacetime region. Therefore, if mistaken for galactic stars then an erroneous higher galactic rotational rate and "velocity curve" is mistakenly observed for the galaxy.

We must realize however, that the assumption of circular orbits for the observed stars is incorrect! We have no good information about how those orbits really are shaped. A far more fundamental concern is that "speed" is a scalar and not dependent on the trajectory of the speeding object. An analogy is that a 4-minute-mile Track Runner's speed at a given point is not measured by "distance per mile run per 240 seconds" or for a marathon runner not measured by "26.2 miles in so many seconds" or for a galactic star not measured by "single orbit distance per orbital period."! No, it is actually based upon the inverse of the time to move a given reference distance. In measuring the speed with which stars move in a galaxy it is for example the number of seconds to move a kilometer or a meter. Therefore, the P_0 observed process time shown in **Figure 4** is approximately 1/100 km/second or 0.01 seconds "per kilometer" and the P_e expected process time also roughly measured from **Figure 4** is approximately 1/64 km/second or 0. 0156 seconds "per kilometer". The expected process takes about 2.73 million

years to reach the Earth, so $t_1 - t_2 = 2.732.73 \times 106$ years and Equation (1) is

$$\begin{aligned} &(0.010 - 0.0156)/2.732.73 \times 10^6 \\ &= -2.08 \times 10^{-9} \text{ seconds per year or } -2.080 \text{ ps per year} \end{aligned} \quad (1c)$$

A big difference from the orbital-period approach, but probably within the possible error of the relatively nearby Earth's muon decay speed–of-time determination of −13 ps/year to −3,521 ps/year. Also this rate of time determined by spectral analyses is possibly underestimated because of time dilation plus gravitational potential!

As already emphasized, the significant departure of the observed speed of galactic portions from the expected speed in **Figure 4** is important and supports the Rollout Theory of our Universe. The expected speed is based upon orbital analyses. The motion of the stars in a galaxy is considered to be an n-body problem discussed, for example, in Section 2.1 of (2). There exist no general analytical solutions for $n > 2$, therefore *General Perturbations* do not apply and one must utilize *Special Perturbations* or numerical integration as discussed in Chapter 3 and Appendix D of (2). Presumably such techniques, including the effects of special and general relativity, GS and GR, were employed in the generation of the expected curve in **Figure 4**. The observed curve in **Figure 4** involves the variation of the speed of time. We consider that curve at about a 40,000 light year radial distance. We discussed the rather startling departure of the observed speed and the "expected" speed for this very nearby Galaxy. Therefore, the P0 observed process time shown in **Figure 4** for radial distances less than 30,000 light years is very approximately 1/120 km/second or 0.000,008,3 seconds "per meter" and the P_e expected process time also roughly measured from **Figure 4** is very approximately 1/40 km/second or roughly 0.000, 025 seconds "per meter". Note that in this case we

use the standard meter not the kilometer for analysis! Therefore, from Equation (1)

$$\begin{aligned}&(0.000,0083-0.000,025)/2.73\times10^{6}\\&=-6.12\times10^{-12}\text{ seconds per year}=-6.12\text{ ps/year}\end{aligned}. \qquad (1d)$$

But, of course, we should not jump to conclusions since the speed of the stars at the periphery of the Galaxy may include Doppler observations of those stars at a greater distance OBSERVED THROUGH the periphery of the Galaxy and operating in a higher-speed-of-time spacetime region of our Universe! However also recall that possibly the variation of the speed of time may also be dependent on the density of surrounding matter of the galaxy or other characteristics of the nearby features of spacetime. Like calculations based upon other observational data, this apparent increase the speed of time or cosmological effect (CE) must be taken into account in any comprehensive Theory developed for the change in the speed of time in our Universe. As has been pointed out, so far there is no a priori means to establish the speed of time. Let the observational data be our guide to a Theory of Time!

4. Separation Speed of Celestial Objects to Measure the Speed of Time

The Hubble Space Telescope (HST) observations of the stellar-object-separation speed of very distant supernovae showed that, a long time ago (billions of years ago), the universe was actually expanding more slowly than today. So the expansion of the universe apparently has not been slowing due to gravity, as it should! The expansion has apparently been accelerating! No one expected this since gravity should be slowing speeds down. No one knew how to explain the situation except to invent some invisible "dark energy" caused acceleration. So far no one has been able to detect this dark energy-truly a mystery! But wait! How is the speed of these very distant celestial objects' relative to

our Earth measured? Again, like the speeds of portions of a galaxy, the speed is measured by the Doppler Effect!

According to our working hypothesis [12] , the speed of time was greater in the past. Since we can only see stars as they were in the past, we suggest that speed of time was greater in the vicinity of those stars we observe and greater and greater the farther away they are (their photons taking longer to reach us). The situation is just like viewing a scene with a variable-rate movie projector. In an old movie projection suppose the film was moving faster through the movie projector than usual, like the time moving faster. The situation is that the people on the movie scene appeared to be moving fast, but their actual speed was the same, usual speed! In order to illustrate this point, let's consider another situation: From an observatory here, violin strings in a billions of light-year distant place with time running fast, would appear to vibrate faster and, if it were possible to hear the violin, then the violin's pitch would appear to be higher (like a spectrum showing a higher frequency and being more blue and less red). However, inside that billions of light-years away concert hall the violin strings would not appear to vibrate faster and violin's pitch would be unchanged! In fine, as we have just discussed, if time is running faster in a receding star's vicinity, then the reddening of stars will appear to be less since their spectra appears to move toward the bluer, higher frequency end and diminishes the observed Doppler-Effect-determined speed (as already noted, time dilation and gravitational potential have the opposite, *i.e.*, cause a more reddening, effect). The situation would seem to a casual observer that the higher speed of time in the past would make the receding speed of celestial objects increased or seem faster. This is not the case, the receding speed appears decreased as measured with a Doppler-measurement due to increased speed of time! That is, due to an increased speed of time, the star's

receding speed is actually larger than the spectral, Doppler-determined, receding speed shows! We will now explain in more detail this situation by the following story: A scientist sits in a train station and requests the station manager to tell him how fast the trains are moving when a receding train reaches a mile-away point. Like the recessional speeds of celestial objects, the scientist only considers the recessional speed of the trains**.** The first train to pass is going at a 30 mph, recessional speed at the mile-away point down the track. The scientist notes in his log book that the receding train's-whistles frequency drops a little from the whistle's normal frequency at the one-mile distance point. Of course this frequency drop seems reasonable, since the whistle's sound waves are stretched out a little as the train recedes. The second train to pass is moving at 60 mph and the receding train's whistles frequency drops at the mile down-track point even more since the sound waves are stretched out even more by the rapidly receding train's whistle. The scientist records the whistle frequencies in his log of train-whistle frequencies for train receding at different speeds. He observes that receding train Whistle's frequencies drop more for faster receding trains since the sound waves are even more stretched out. The next day another train passes and the scientist wants to test out his work. The scientist tells the station manager that according to his log he expected that, from the frequency of the whistle, the currently receding train is going 30 mph**.** "No" says the station manager "…from my actual observations the train is moving at 60 mph mile at the down the track point from you." The scientist exclaims "But the sound waves are not stretched out as much and their frequency is not low enough for 60 mph". The station manager states that the actual pitch or frequency of this train's whistle had been changed by the Mechanics last night to a much higher frequency so the sound waves seem STRETCHED OUT like a 30 mph train! In the case of a receding stellar object, the increase

in frequency is not accomplished by the Mechanics' whistle-increase modification, BUT BY THE INCREASED SPEED OF TIME INCREASING THE STELLAR OBJECTS APPARENT FREQUENCY! Or in the other by the story, like the violin sound's apparent increased frequency when heard from a distance.

The apparent increase in recessional speed (acceleration) between the Cosmic Microwave Background (CMB) very near the beginning of our Universe (at about 380,000 "years" after our Universes' beginning), of $6.75 \pm 0.05 \times 10^4$ m/s per Mpc [18] and [19] to those of the Cepheid Variables (at about 163,000 light years distant, of $7.4 \pm 1.5 \times 10^4$ m/s per Mpc (Table 5 of [18])) is simply due to the possibly high speed of time back at the time of the CMB. The Doppler-determined speed would be less than the true higher recessional CMB speed (producing a deceleration when compared to the Cepheid Variables speed) and agrees with a slowing due to gravity! No dark energy need be assumed!

The Hubble constant, H_0, is approximately $H_0 =$ 70 [km/sec/Mpc]. But can be expressed as the inverse of the time, T, in seconds for a celestial object to move an Mpc or $(3.09 \times 10^{22}$ [m/Mpc])/(70,000 [m/sec]) $= 4.4 \times 10^{17}$ [seconds].

For calculations of the Process times, T, of celestial objects given their speeds of recession, we utilize the equation

$$T = 4.4 \times 10^{17} \times (S/70)\,(\text{seconds}) \qquad (2)$$

where S is the recessional speed of the celestial object in [km/sec/Mpc].

The CMB has a Speed, S of 74 [km/sec/Mpc]. Therefore Time,
$T = 4.4 \times 10^{17} \times (74/70) = 4.65 \times 10^{17}$ seconds for celestial objects, such as the CMB fairly near the beginning of our Universe, to separate a "given distance" of a Megaparsec. Under a "popular" Theory of our

Universe (not however, proposed in [12]) that the separation speed of objects in our Universe should remain a constant, this number of seconds would be expected everywhere in our Universe, therefore $P_e = 4.65 \times 10^{17}$ seconds.

Likewise for the more nearby Large Magellanic Cloud Cepheid's, which have an observed speed, S, of 67.5 [km/sec/Mpc] Time, $T = 4.4\times10^{17}\times(67.5/70) = 4.24\times10^{17}\,\text{seconds} = P_0$. Of course, the reference or "given distance" is huge as is the time interval between observations of the separation speed of these celestial objects in our Universe. An alternative approach would be to define the "given distance" as simply the MKS meter as was utilized for the galactic measurements. Of course a kilometer could also have been chosen as the "given distance", so the choice is rather arbitrary. In the case of the galactic star's measurement, a galactic star's orbital period was not a valid, constant or unique "given distance", therefore the meter was selected as the reference or "given distance." In the case of the separation speed of celestial objects the Megaparsec in meters is a definitive unit of distance in MKS units and the same for all celestial objects under consideration. Also the assumption of a constant speed of recession is simply a popular concept and not involved in the working hypothesis Theory [12]. Therefore, these calculations should be considered to be extremely provisional and needs to be examined very carefully!

Other "given distances" or "expected times" values for P_e might in future be realized better utilizing, Fast Radio Bursts (FRBs), Soft Gamma ray Repeaters SGRs, pulsars, double star orbits, etc. If these measurements disclose that their frequency or periodicity increase slightly as they or their sources are measured to be further and further from our Earth, that is older and older, then their measurements might provide good, more detailed data on our Universes' variation of the speed of time.

From Equation (1), the variation of the speed of time between the CMB and the Large Magellanic Clouds, in which there are about 13 billion or 1.3×10^{10} years between these observations or $t_1 - t_2 = 1.3 \times 10^{10}$ years is:

$$\begin{aligned} &\left[P_o(t_1) - P_e(t_2)\right] / (t_1 - t_2) \\ &= \left[4.24 \times 10^{17} \text{ seconds} - 4.65 \times 10^{17} \text{ seconds}\right] / 1.3 \times 10^{10} \text{ years} \\ &= -3.15 \times 10^{6} \text{ seconds per year} \end{aligned} \quad (1e)$$

$= -3.15 \times 10^{18}$ ps per year or about −0.1 s/s. Therefore over hundred trillion or more times larger compared to the muon-decay-time derived variation of the speed of time of −13 ps per year to −3500 ps per year values. This CMB value is extremely large and subject to considerable scrutiny but is still in keeping with our working hypothesis [12] that the speed of time was far greater in the distant past near the beginning of our Universe than today! Essentially both time and the space-dimension spacetime of our Universe commence expanding at the speed of light according to [12].

The CMB is close to the beginning of our Universe, nevertheless the CMB is not close enough to be particularly useful in developing a Theory for the variation of the speed of time. For that we require information from the HFGWs created at least a nanosecond nearer in time to the beginning of our Universe. What really happens at the "point" where time and space commence must await the analysis of the HFGW spectrum of the early Universe. But recall that the variation of the speed of time after that commencement "point" may well also depend upon "where" one measures the variation of time on the fabric of spacetime, the local mass distribution of matter or some other feature of our Universe!

5. Muon-Decay Time Revisited and Non-Varying Rate of-Time (NVRT) Processes

Is there something more fundamental going on concerning muon-decay time? Not just "muon decay operates with a different 'clock' or time than the clock the rest of us and our Universe uses." As discussed in Section 4 of [20], perhaps muon-decay time is a different kind of process. Let us explain the situation with another story: We will utilize the fictitious tale of a tribe called the "Muons" who originated billions of years ago near the beginning of time and exist even today. The Muons all have the unique capability to consistently run a mile in exactly four minutes. Recently a Muon runner came to my mile-long track. She asked if she could borrow my watch since she had misplaced hers. I agreed and handed over my watch with the admonition that my watch only showed the correct speed of time in my location at this specific local time. She looked at the watch and exclaimed: "…it is absolutely identical to the watch that I and my entire Muon tribe had used for billions of years … my watches' rate of time is exactly the same, not too fast and not too slow, as the watch I had always had and lost!" If there is one thing these Muons know about, it is time!

The Muon runner ran my mile-long track and at the track's end, while looking at her "new" watch, she exclaimed "Perfect! My wristwatch shows exactly four minutes!" She told me that the Muons could not actually "see" the track – as a matter of fact, they could not judge or "see" any distance! "We Muons cannot recognize or even comprehend the three dimensions of space—we only recognize the time dimension." Also she stated that I should be careful using the wristwatch that I replaced the one I had given her. "Perhaps your replacement wristwatch was not perfect!" She said: "After looking at your replacement wristwatch I discovered it is flawed in that it seems to slow down with time, whereas the one you gave does not!"

What else does this story apply to? Let us suppose that, say, Nucleosynthesis is similar to muon decay and is a Non-Varying Rate of-Time (NVRT) Process and marches to the Nucleosynthesis own drum as it were. We make the very provisional assumption that there is no actual motion of the nuclei in space; that these high-energy collisions among nucleons only occur with a certain process-duration time just like muon decay! If we were able to observe this Nucleosynthesis process in operation today, then the process like muon decay would appear to take less and less time to be completed as our Universe's time slows down as measured by a Timer's stopwatch. Like the 4-minute-mile Muon runner, whose inherent "wristwatch time" seems moving faster than the current Universe time of a Timer. She stops her mile run before the Timer's stopwatch of today reaches the 4-minute point. Therefore, the Timer believes that she has run for a shorter time to complete the mile run (that is, to complete her "process")! In a sense we are observing compressed time from a vantage point of uncompressed time. So as we might observe Nucleosynthesis from afar through our telescopes today, the process would appear to occur more and more quickly over the years of observation just like the process of muon decay! If that does not occur, then Nucleosynthesis is not a NVRT process otherwise the process is a NVRT process!

There may be other transient processes or subsystems that involve one or more quantum-mechanical sub-reactions, some well understood and some not well understood, that in total comprise a complete, possibly multiple-step process having a well-defined beginning and end. This is the proposition:

Proposition (page 65 of [11]) that some complex processes or sub systems are "marching" to their own intrinsic" time" or timeframe that is independent of the flow of "time" in our Universe. (We call them Non-Varying Rate of-Time (NVRT)

Processes.)

That is, besides muon decay there may be other such process that we define as the Non-Varying Rate of-Time (NVRT) Processes. Such processes do not "go with flow" of time slowing in our Universe. Such NVRT processes, according to our working hypothesis, may include those that generate Big-Bang Nucleosynthesis (BBNs) generation of Oh My God (OMG) very high-speed particles, Fast Radio Bursts (FRBs), Soft Gamma ray Repeaters SGRs (the latter two possibly from Magnetars) and perhaps weak nuclear reactions of proton-proton chain (affecting stellar luminosity but far more likely not to be NVRT processes since they probably are "space-coordinate" dependent in their operation). We will concentrate the following analyses on muon decay since we have studied that process in some detail. By the way, galactic motion, black-hole mergers, Nova and other more extensive in motion in the three space coordinates and less quantum-mechanical in operation are not NVRT processes. Unlike the hypothetical Muon runners they recognize the three space dimensions. Also their time varies as time mainly does in our Universe—they "go with the flow!"

It is important to understand that the Non-Varying Rate of-Time (NVRT) Processes working hypothesis or concept is not directly related to the Rollout of the Universe Theory [12], multiuniverses, special or general relativity, hyperspace, parallel universes, etc. the NVRT process is a very new and different concept!

Let us continue the discussion by using a standard muon-decay illustration as shown in **Figure 5**.

The very most important property of this standard diagram of muon decay shown in **Figure 5**, is that there is only one dimension involved: T or time. No space dimensions at all! We contrast this with the standard diagram of proton-proton chain reaction, which generates stellar luminosity,

shown in **Figure 6**.

In this case an "alarm clock" that signals the beginning (when the alarm clock is set off by an experience e.g., a collision with a cosmic ray) and simply signals the end of the muon decay process when the alarm clock "rings"! Hydrogen and helium atoms move and physically collide with each other. They actually move

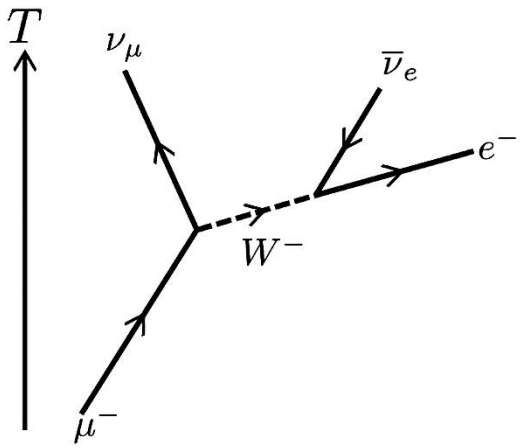

Figure 5. Standard diagram of muon decay.

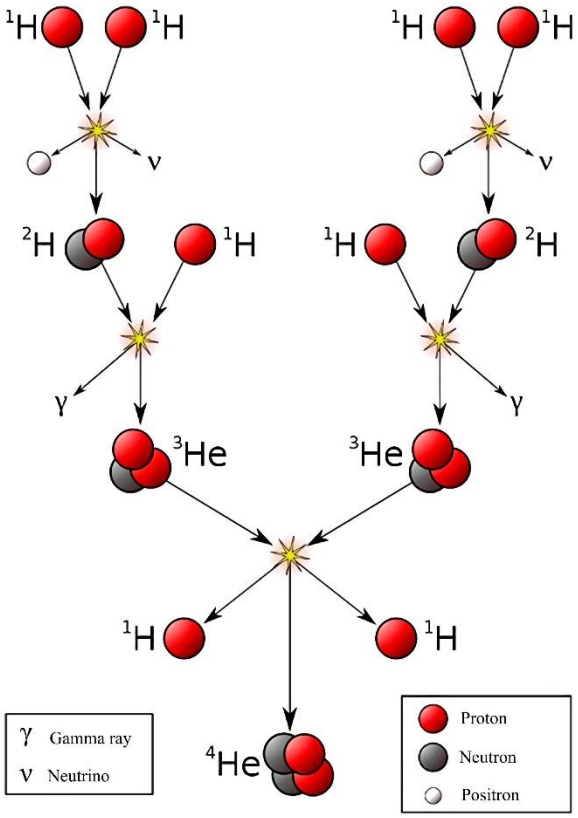

Figure 6. Standard diagram of proton-proton chain reaction.

through the dimensions of space! The idea is that *NVRT* processes, such as muon decay, are in a sense not actually a part of the spacetime continuum! Specifically, they have their own clock, that alarm clock time interval is completely independent of where in space the collision occurs or especially any "space change" in the Muon's decay process during that process!

Do the Non-Variable Time Rate (NVRT) processes, like muon decay processes, relate to processes such as production of new elements and those that are involved in the mysterious core-collapse of supernova [21] happening billions of years ago? If such is the case, then we may have another mysteries solved!

6. Conclusions

An equation is presented involving the observed

time for a process to be completed and the expected time for the process to be completed. The difference between these two times is attributed to a change in the speed of time. For the Process of muon decay the speed of time is found to decrease at the rate of between −13 picoseconds, ps, per year and −3521 ps/year at about the date of 1981 on Earth. Although it would not affect the correctness of the theorized Theory of our Universe [12], more accurate measurements of muon decay time are needed in order to actually calculate an accurate local speed of time on Earth or indicate that muon decay time does not change with time and is not a NVRT process. For a galaxy, such as Messier 33, the variation of the speed of time appears there to be −6.12 ps/year to at most −2080 ps/year (at the galaxies' outskirts) as a very provisional determination. However this speed of time for Messier 33 may actually be caused, at least in part, by the Doppler shift of stars observed beyond the Galaxy in spacetime regions of higher speed of time and apparent higher speed or some other effect. However, no dark matter need be assumed. From the speed of separation of celestial object as our Universe progresses, we find that in the time between the observations of the receding speeds of the CMB and the Large Magellanic Cloud Cepheid's of approximately thirteen billion year, there is a speed of time change of -3.15×10^{18} ps per year or about −0.1 s/s. This calculation is in keeping with the theorized very much higher speed of time in the past of the CMB near the beginning of our Universe, predicted by [12] and the much slower speed of time in our current observations of the relatively nearby (in time and distance) Large Magellanic Cloud Cepheid speed. There is no acceleration of the speeds of these celestial objects speed of separation. Those separation speeds are decreasing as usually predicted by gravity and by using our speed-of-time theory, so that dark energy is not required!

Other determinations of the variation of the speed of time, and independent of special and general relativistic effects, might be by utilizing the Processes involving Fast Radio Bursts (FRBs), Soft Gamma ray Repeaters (SGRs), pulsars, double star orbital periods, etc.; of course only if these measurements are precise enough to disclose that their frequencies or rates appear to increase slightly as they or their sources are measured to be further and further from our Earth.

Other possible indicators of the variation in the speed of time besides muon decay time, quite valuable because they are independent of special and general relativity effects, might be found in meteoritic composition change over hundreds of thousands or millions of years. The research by Turner, *et al.* [22] found time differences in meteoritic-composition analyses that might relate to the speed of time: They found "... that the fluid-mobile uranium ion U^{64} moved within the past few 100,000 years … This time scale is less than the cosmic-ray exposure age… when they were ejected into space. Fluid flow occurred after melting of ice" by impact heating (ablation) or solar heating. Or possibly, the effect was the result of the change in the speed of time right after the Earth was formed and today. The process here is the melting of the ice, the time it would be expected to occur and the time when it actually occurred.

With regard to galactic data to be utilized to compute the speed of time; in Section 3 we have computed the difference between the velocity curves in **Figure 4** of the nearby Messier 33 galaxy would lead to a speed of time between about −2 and −2,000 ps/year. However, galaxies closer to the beginning of our Universe might also lead to estimates of the speed of time. As summarized by Wardlow [23] "… key features of a mature galaxy arose more rapidly than has been thought." Lelli, *et al.* [24] state "We conclude that massive bulges

and regularly rotating disks can form more rapidly in the early Universe than predicted by of galaxy formation." Therefore, the speed of time may be roughly computed by differencing the expected time and the observed time that features of galaxy formation appear.

We concluded with a study of Processes like muon decay, which may operate with a "different clock," a clock that does not participate in the variation in the speed of time that the rest of our Universe does—we call these Processes Non-Varying Rate of Time or NVRT processes.

The speed of time and/or the speed of time's variation may well depend upon "where" one measures the variation on the fabric of spacetime and/or the local mass distribution of matter or some other feature of our Universe.

In order to establish a Theory for the origin and variation of the speed of time, we conclude that HFGW detection is required to understand the activity of Processes at a nanosecond or less after the beginning of our Universe [16]. We contend that primordial or relic HFGWs were propagated before our Universe became transparent to electromagnetic radiation. If such primordial HFGWs can be detected by the Li-Baker HFGW detector, discussed in connection with our analyses of Muon decay, then their observations may not only contain information on the speed of time, but information, gained by means of the analyses of their frequency spectrum, concerning the processes themselves.

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Authors' Contributions
Conceptualization and all analyses: R.M L B., Jr and B. S. B. and introduction of entropy and many HFGW-detection concepts FY L.

Conflicts of Interest
There were no competing interests of any author.

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IN A NUTSHELL

According to the Rollout Theory:

Time in the past, nearer to the beginning of our Universe, was moving faster than it is today. So the galaxies APPEAR to rotate faster in the past than they do today. *Dark matter* was INVENTED to explain why, at their apparently higher rotational rate, galaxies were not pulling apart due to APPARENTLY higher centrifugal force. Therefore in actuality it is NOT rotating fast, there is no need for *dark matter* to hold galaxies together.

Time in the past, nearer to the beginning of our Universe, was moving faster than it is today. The frequency of stellar spectra is shifted to the **blue end** if a star is approaching and to the **red end** if it is receding. Very near the beginning of the Universe time is moving extremely fast so there is an **EXTREME RED SHIFT** to the microwave end of the spectra of the receding stars nearer to our Universe's beginning and could be the source of the *Cosmic Microwave Background.*

Suppose the separation **speed** between stars was **increasing,** or **accelerating,** as one moves away from the center of our Universe and toward our Solar System and the **speed of time is unchanged.** We would then see the gradually increasing redshift of stars as one views them further and further away from the center of our Universe. BUT if the **speed of time was gradually decreasing** as one moves away from the center of our Universe and toward our Solar System, then we would **also see** the gradually increasing redshift of stars **without any need for them to be increasing their separation speed or accelerating** and no need for the INVENTION of *dark energy.*

Observational proof

In order **to PROVE** or at least add credence to the new Theory, more IN THE WAY OF *Observational Cosmology* is needed. Specifically, **OBSERVATIONAL DATA** on the following:

Specific Data Required

1. Radio Astronomy Doppler data on stars far enough away from the Messier 33 Galaxy **NOT** to be greatly influenced by its gravitational field. Hopefully, it will show star speeds in the background (further away in space and time, than Messier 33) AND add some credence to my theorized higher-speed-of-time in the past, concept. **BUT** they must **NOT** have been excluded because of some other characteristic from the average spectral-star-observations of the stars on the periphery of Messier 33 **and actually have been the reason for the invention of dark matter!**

2. In 1929, Edwin Hubble discovered that our Universe is expanding, with most other galaxies speeding away from us. Light from these galaxies is shifted to longer and redder wavelengths in their spectra– in other words, their light is red-shifted, a result of the high stellar separation speed involved in the expansion of our Universe. In the spectrum, even **lower** frequencies, due to even **higher** recessional speeds, below red **are microwaves**! Radio Astronomy Doppler data on objects comprising the Cosmic Microwave Background are needed to show the spread of frequencies are in the **microwave** frequencies of 10^{11} to about 10^{7} Hz that COULD be associated with an "**extreme red shift**" due to very high recessional stellar speeds near to the beginng of our Universe in accord with the Rollout Theory! Copied from Slide 7 of:

Rollout Theory of Universe +.pdf

3. This third request is **NOT** ESSENTIAL to my new Theory, but rather I believe it an interesting manner in which to establish the speed of time near our Earth: I would enjoy seeing more recent precise/accurate measurements of Muon decay time. Possibly by the *US National Bureau of Standards* utilizing their latest metrology or by the *MuLan Collaboration*. I understand the limitation

of Muon decay time estimation may not be the clock frequency or precision—Bureau of Standards clocks are significantly more precise than needed for Muon decay measurement exhibiting far more precision / accuracy -- it is mainly a challenge of systematics, but could it be accomplished by **some** research group? Please see: "**A Working Hypothesis on the Muon-Decay Time Shortening and Time**" by Robert M L Baker, Jr., (*Journal of Space Science and Technology*, 2019, Volume **25**, pp. 60-77).

4. Although black-hole and neutron-star mergers progress with the same duration independent of the local speed of time or location in spacetime, they may APPEAR in their spectrum to proceed more rapidly in the past when the speed of time was faster! It would be useful therefore, to determine if, indeed, there was evidence of "shorter merger times" further back in time and space.

Possible Recent (August 2021) Literature Support for Rollout Theory

There has been a few recent articles concerning galaxies whose comments might be consistent with my Rollout Theory:

1. "But the findings clash with the measurement of how fast the galaxies are flying apart from each other, and predict that the Universe should be expanding at a significantly slower pace than is currently observed." That is, the Universe is expanding FASTER than expected!!! Davide Castelvecchi *(Nature*, 23 July 2020, pp. 500-501).

2. Adam Riess (*Johns Hopkins University*, Baltimore, Maryland) says "… that perhaps it is cosmology's standard model that is wrong instead… my gut feeling is that there is something interesting going on." could that something "interesting" just possibly be *the Rollout Theory of our Universe*? Dr. Riess' remarks are reported in same *Nature* issue as above.

3. "We conclude that massive bulges and regularly rotating disks can form more rapidly in the early Universe than predicted by models of galaxy formation." Federico Lelli, et al., *Science*, 12 February, 2021.

4. "This finding suggests that processes that generate the key features of a mature galaxy (~12.5 billion years ago) arose more rapidly than has been thought." (Julie Wardlow, same issue pp. 674-675).

5 " Observations have established that the total star-formation rate in the Universe rose steeply after the Big Bang, reached a peak at redshift z between 1.5 and 3, , and have declined steadily since then." And (same page third column): "A steeply rising, and/or constant velocity curve has been measured in other high redshift (far away) galaxies". Tsukui and Iguchi, in: "Spiral morphology in an intensely star-forming disk galaxy more than 12 billion years ago" (*Nature* 11 June 2021, Vol. **372**, Issue 6547, pp. 1201-1204. That is consistent with the speed of time slowing as the Rollout Theory predicts!

6. "Together with earlier spectroscopic data for MACS1149-JD1, our analysis of this enlarged sample provides further support for a cosmic star formation history extending beyond redshifts $z \simeq 10$." In "Probing cosmic dawn: Ages and star formation histories of candidate $z \geq 9$ galaxies" N. Laporte, R. A. Meyer, R. S. Ellis, B. E. Robertson, J. Chisholm, G. W. Roberts-Borsani *Monthly Notices of the Royal Astronomical Society*, Volume **505**, Issue 3, August 2021, Pages 3336–3346, to be published). The apparent higher "speed" of star formation and recessional speed of celestial objects are both compatible with the higher speed of time "near" the beginning of our Universe (i.e., higher redshifts) suggested by the Rollout Theory. **Of course, "compatibility" is not "proof" of a theory but merely adds credibility to it!**

These six articles seem to suggest that galaxies were actually going and star formation growing faster in the past than originally estimated by utilizing cosmology's standard model. My Theory states that these apparent effects are the result of the increased speed of time back then and NO, so far undetectable, dark matter is required.

EVOLUTION OF LIFE-FORMS IN OUR UNIVERSE

By Robert M L Baker, Jr., Bonnie Sue Baker and Jeannie Hall Fontana

August 17, 2021

ABSTRACT

The major law for all life forms, be they amoebas, bugs or bunnies, in our Universe is SURVIVAL OF THE FITTEST. The FIT life forms require the most effective protection or shield against "predators" ranging from viruses, bacteria, dangerous animals, dangerous vegetation… essentially protection or shield against ANY adversarial or dangerous life form or environmental danger such as radiation. The effectiveness of such a shield is directly proportional to their resistivity to predators and other dangers and inversely proportional to their area. Resistivity of the shield will be determined by the characteristics of the predators or environmental dangers encountered. It is proposed that manipulative appendages such as human limbs e.g., arms, legs, hands, etc. will disappear and evolve into "mind-controlled" Artificial-Intelligence implemented external mechanisms. All communications will be by mind and between similar life forms mind-to-mind. How would life forms evolve to maximize volume, required in order to house their increased mental capabilities consisting of cognitive/electronic material of the highest possible density, and minimize surface area for protection? Since it is the geometric figure exhibiting the largest volume to area ratio, their shape would be spherical. Therefore, life forms will evolve into spheres whose size will be determined by their density, environment and the local gravitational field. That is, the sphere's mass will need to allow necessary movement and be "sustainable" in the sphere's local gravitational field. Life forms could therefore, evolve into spherical "artificial" planets orbiting stars or galaxies – powered by "starlight." Their *i*ntersphere and interstellar communications would be by means of mind-controlled transceivers of high-frequency gravitational waves (HFGWs) since such waves pass though all matter unattenuated.

1. INTRODUCTION

It is presumed that the basic law for all life forms in our Universe is SURVIVAL OF THE FITTEST as proven by Charles Darwin and others. The more FIT life forms require the most effective protection or shield against "predators" ranging from

viruses, bacteria, dangerous animals, dangerous vegetation… essentially protection or shield against ANY adversarial or dangerous life form or environmental danger such as harmful radiation. The effectiveness of such a shield is directly proportional to their resistance to predators and other dangers and inversely proportional to their area. Resistance of the shield will be determined by the characteristics of the predators or environmental dangers encountered and for this study is not considered to be an issue. It is proposed that manipulative appendages such as human limbs e.g., arms, legs, hands, etc. will disappear and evolve into "mind-controlled" Artificial-Intelligence implemented external devices or mechanisms. As shown in Figure 1 in which an artificial arm and hand take control of an external device.

Figure 1. An artificial arm and hand take control of an external device. From Figure 2 of [1]. All such controls and communications will be by mind and between similar life forms mind-to-mind. Such controls and communications are not anticipated to involve significant external systems such as antennas, but only devices internal to a given life form. How would life forms evolve to maximize volume, required in order to house their increased mental capabilities consisting of cognitive/electronic material of the highest possible density, and minimize surface area for protection? Since it is the geometric figure exhibiting the largest volume to area ratio, their shape would be spherical. Please see Figure 2 for a fictional picture

of such a life form.

Figure 2. Fictional picture of a spherical life form the 1953 Movie “Invaders from Mars.”

Therefore, life forms will evolve into spheres whose size will be determined by their density, environment and the local gravitational field. That is, the sphere’s mass will need to allow necessary movement and be “sustainable” in the sphere’s local gravitational field. Life forms could therefore, evolve into spherical “artificial” planets orbiting stars or galaxies – powered by “starlight.” As in Figure 3Their intersphere and interstellar communications would be by means of mind-controlled transceivers of high-frequency gravitational waves (HFGWs) since such waves pass though all matter unattenuated.

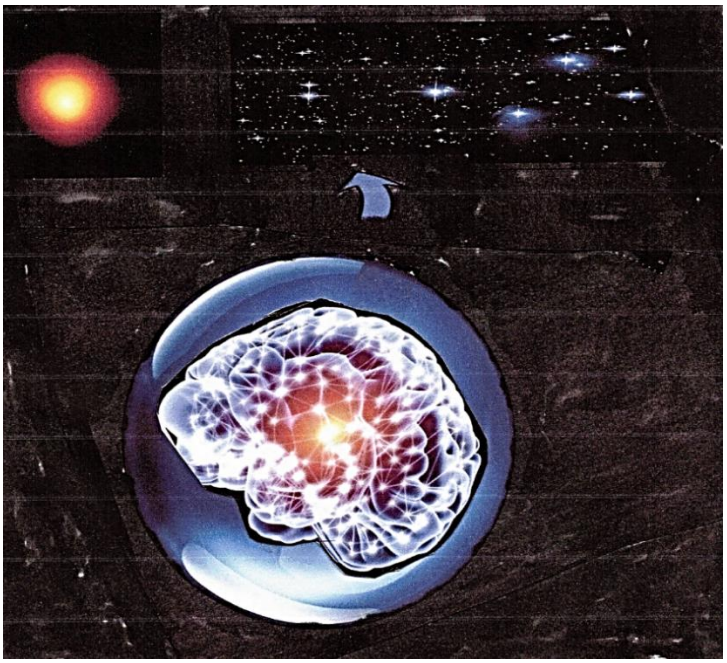

Figure 3. Life forms evolve into spherical "artificial" planets orbiting stars, powered by "starlight."

2. CURRENT TRENDS IN HUMAN LIFE-FORM EVOLUTION

As was discuss in [1], "… advance has been taking shape over the past several decades, but most dramatically over the last few years. Broadly speaking this advance is the introduction of electronic components into the human body and especially into the brain. As a specific example of such advancement is the actual mind control of a mechanical hand shown in Figure 3. Here we see an actual person whose mind, via an electronic interface, controls a mechanical hand to feed herself a candy bar!

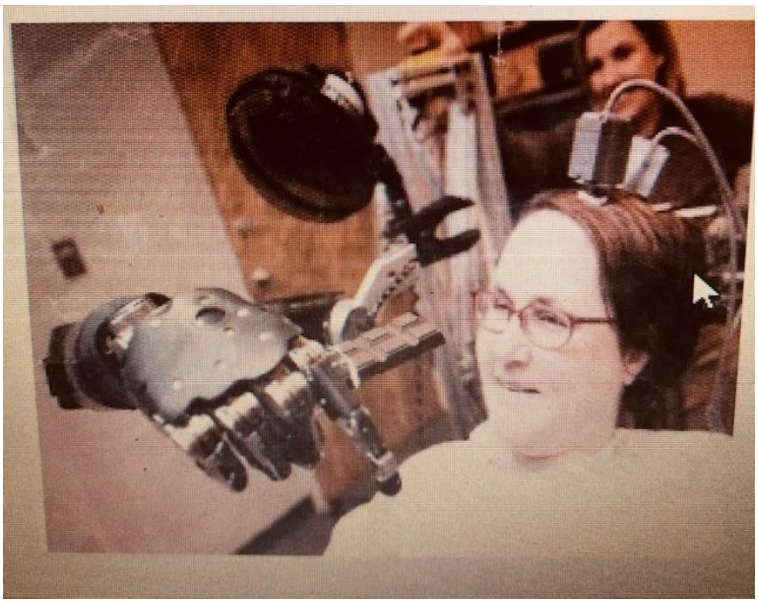

Figure 3. An actual person whose mind, via an electronic interface, controls a mechanical hand to feed herself a candy bar.

The clear outcome would be human evolution to a combination cybernetic or electronic and biological human being: a 'cyborg.' As was reported by Robert F. Service [2] in the Journal *Science* 'The beginnings of a cyborg world have already arrived …!' and Manuela Veloso who suggests that we 'Embrace a robot-human world.' [3]." It is suggested that such cyborg forms of intelligent beings would allow advanced civilizations to endure at least hundreds of thousands of years.

Advanced humankind will evolve into a cyborg entity due to documented technologies. Furthermore, such entities could well be repairable and include technological improvements in their "parts" as time goes by. Therefore, cyborgs could be immortal and constantly improving. In any event, it is concluded that the human lifespan on our Earth will dramatically increase with the advent of advances in "cyborg technology". Obviously, such an advance would produce a myriad of new problems for humanity such as the necessity for stringent population/birth control, new governmental paradigms–not only transition to a huge aging population but possibly an "ageless" population!

There are fictional projections of homo sapien's evolution. Nevertheless, research progress is real, as a mix of biologist, materials scientist, and nanotechnology experts are chipping away at a host of challenges. "I see it as building a seamless interface between cells, tissues, and electronics," says Aleksander Noy, a bio-nano-electronics expert at Lawrence Livermore National Laboratory and the University of California, quoted by Service [2]. For now, most of these efforts focused on providing better health care and quality of life for patients. Nevertheless, over time, expect devices "… that will make us better athletes and soldiers," or even reduce our facial wrinkles! For example, the Electrolift® mask device discussed by Baker [4]. "A few years ago these things were science fiction. But now we are seeing the emergence of real devices and applications," Noy [5]. "And fast…" says Zhenan Bao, an organic electronics expert at Stanford University in California: "The competition is furious" according to Service [2]. The idea of fusing man and machine has long tantalized humanity. Over the past century, researchers have pioneered myriad efforts to use electronics to measure biological activity and sometimes even alter it. According to Underwood [6], Geoffrey Ling, a top biotechnology research official at the Defense Advanced Project Agency, challenged neuroscientists to do something extraordinary: "Develop an implantable device in a human brain that can reverse memory loss. Also UCLA's Brain Institute and other universities are developing electronic prostheses that interact with brain regions critical to memory. Victims of stroke may soon have improvement due to brain implants that still allow individual decision making or "thinking" (Ganguly, [7]). Michael McAlpine, a mechanical engineer at Princeton University, and colleagues (Machens, [8]) reported in the May 1, 2013 issue of *Nano Letters* (Mannoor, [9]) that they've made the first 3D printed functional organ: a bionic ear that "hears" acoustic sounds and ultrasounds. "We're trying to see if one could introduce augmented functionality that a human wouldn't ordinarily have…" McAlpine says. "Organs from the lab …" appear to be realistic even today as discussed in the June 18, 2015 issue of *Nature* (Marx, [10]).

One probable evolving form would involve the replacement or repair of their "parts" especially if they were largely composed of electronic components as we predict for human life forms. As it has been stated such cyborgs would be essentially immortal or at least very long-lived. Also it is essential to identify and quantify the means of their interpersonal intercommunication. A step in that direction is presented in Hirschberg and Manning [11]. An obvious conclusion is that evolution will produce some form of efficient and unmitigated, yet editable, direct brain-to-brain or mind-to-mind intercommunication. Certainly, the direct "plug" to one brain that transfers

thoughts to control a complex prosthetic device, Figure 3), could eventually be expected to direct thoughts to and from another brain. Such intercommunication signals would modulate the High-Frequency Gravitational Waves or HFGWs. The concept is like the modulation of radio waves by sound waves. It would be like an advanced cipher or encrypted message to be decoded and we would be eavesdropping on "them" using High-Frequency Gravitational Waves.

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(From: Quora Digest <english-personalized-digest@quora.com>
Sent: Sunday, September 11, 2022, 4:36 PM
To: drrobertbakerjr@gmail.com)

To: Quora Digest

From: drrobertbakerjr@gmail.com)

Sent: Sunday, September 11, 2022, 5:58 PM

If the James Webb observations are correct, then both alternatives are a sure thing. All Theories in science are provisional, that is "a hypothesis that is provisionally accepted as a basis for

further research in the hope that a tenable theory will be produced, even if the hypothesis ultimately fails." Theories of Our Universe date back to at least the fifth century B.C. The Greek Philosopher Anaxagoras who believed the Earth was a flat dish that floated on a cushion of air like a puck on a cosmic air-hocky table. His Theory was abandoned due to an absence of supporting observations.

Volume 6, No. 4, October 2020 and *Journal of Modern Physics*, Vol.**12** , No.6, May 2021, pp. 761-780). So far, that Rollout Theory seems to be supported by the James Webb Space Telescope Observations as well as other astronomical observational data. In addition, it does not require the existence of dark energy or dark matter**. But like all other theories it would fail if further observations were not consistent with it.**

Bob Baker

IMAGINATION (R$UGH DRAFT 4)

Dr. Robert ML Baker Jr. and Bonnie Sue Baker,

September 24, 2022,

Abstract

All efforts to develop computer programs to simulate the workings of the human brain, Artificial Intelligence (AI), can be stymied by attempted simulation of the human brain's trait of imagination. Here we consider the process of imagination utilizing models based in part on imaginative fiction, especially science fiction. We build the brain's electronic function utilizing an array of computer subroutines or algorithms. Especially important is the application of AI to Cyborgs. The June 7, 2013, issue of the *Journal SCIENCE* (Vol. **340**, Issue 6137, pp. 1162-1165) states that now the "Cyborg Era Begins". Certainly therefore, the study of these cyborgs is currently of paramount importance to Applied Science and Engineering. Consequently, our treatment of the application of AI in general and computer simulation of IMAGINATION in Cyborg's brains, become critically important issues.

1. INTRODUCTION

Historians reported Einstein to have commented that: "Imagination is more important than knowledge. For knowledge is limited to all we now know and understand, while Imagination embraces the entire world, and all there ever will be to know and understand!" and George Bernard Shaw wrote "Imagination is the beginning of creation …" Shaw was extremely perceptive. The first author developed hie Rollout Theory of *creation*, or the beginning of our Universe, after the second author, Bonnie Baker, *imagined* that it was reasonable that time had a speed like movement in the other three space dimensions.

The first author is in "cognitive decline". Worse than ever at 92.2 years of age he cannot remember things, worse than when he was young! He is more easily

confused. He is now in a "brain fog". But guess what? he can still "imagine." What you are now reading is mostly from the first author's Imagination!

What makes a good chef, a good artist, a good detective, a good doctor, a good writer, Yes and a good Scientist? The answer that, among other things is **IMAGINATION**. So, while the authors still have an Imagination, allow us to discuss it. We are told by Dr. John Robinson, at *Eisenhower Hospital* in Palm Desert, CA 92260, that our brain has many parts. The first author has recently written in his *Autobiography* about what he calls "the Intermediary Memory", which maybe one of those brain parts. On the other hand, a recent article [Ivan Voitov &Thomas D. Mrsic-Flogel, "Cortical feedback loops bind distributed representations of working memory", *Nature* **608,** August 11, 2022, pp.381 389] indicates that it may be distributed throughout a brain.

1. INTERMEDIARY MEMORY

Two quotes from Jessica Boddy in The Scientific Periodical '*SCIENCE*", 2008 and 2016.

First Quote: "Memory Researchers have shown light "to cognitive limbo". A new Memory – the name of someone you have just met for example - is held for just seconds in so-called "Working Memory", as your brain's neurons continue to fire. If the person is important to you, the name will over a few days enter your long-term memory preserved by permanent neuro connections. **But where does it go during in between hours of limbo, when it has left your standard working memory and yet not embedded in long-term memory?"** [*SCIENCE vol.* **319,** 14 March 2008, p.1543. by Jessica Boddy]

Second Quote: "… a research team shows that memories can be resurrection from its limbo.

"Their observations point to a new part of working memory, which they dub prioritized long-term memory" (**or we term *INTERMEDIARY MEMORY*)** "that exists without elevated neural activity. Consistent with other recent work, the study

suggests that information can be held synapses that connect neurons even after conventional working memory has faded." [*SCIENCE* vol**. 354**, Issue 6316, pp. 1136-1139, December 3, 2016. by Jessica Boddy]

By the way, there are many artificial intelligence or AI computer programs, but where is the "IMAGINATION MODULE" or subroutine or algorithm? Also, the term "absent-minded professor" usually means lost in thoughts on other ideas, but it could have the literal meaning of having a mind with a part absent or missing, that part being the prioritized long-term memory **or *INTERMEDIARY MEMORY*** perhaps also possibly distributed throughout the brain**.**

Back when the first author was in the US Air Force, as he related in his Autobiography, the Commanding Officer General Ritland assigned him a personal secretary (her name was Gertrude) – the only Officer at the Air Force Ballistic Mission Division (AFBMD) to be assigned his own personal secretary besides a full Colonel. The General told the first author at the time: "When I was young, I briefly worked at the *Manhattan Project* (project for the development of our Atomic Bomb). I found a few top scientists there had a problem like yours, Lt. Baker, in fact, Dr. Edward Teller ("Father of the Hydrogen Bomb") like you could not easily *type, file, find files fax or phone* himself. He simply had to have a secretary for him to work effectively"!

The good General assigned me a private secretary since I was, according to the General "…the first one in the World to earn a Ph.D. in Aerospace and the only one at my Center who knew where the rockets we launch went! And I do not want you bothered by routine details." The first author found the same situation when he was Head of the *Lockheed Astrodynamics Research Center* (LARC) in Bel Air, California. He had many top scientists from UCLA on his staff and many of them could not *type well, file, find files, fax, or phone*!

Could the missing brain part for all these scientists be the **INTERMEDIATE MEMORY**, which resulted in their inability to *type well, file, find files, fax, or phone,* possibly its loss was made up for by a larger *imaginary part* of their brain?

By the way, there was an interesting occurrence, which has bearing on typing, the computer revolution during 1950-2000. The first author was the *Chief Scientist* of *Computer Sciences Corporation* (CSC) during those interesting times working for the President Fletcher Jones. All the kids began typing on computers. we have learned that youngsters are more able to learn foreign languages than oldsters so maybe more kids were more motivated and capable to learn to type on computer boards back then, when their brain "wiring" was more adaptable to the typing task!

2. IMAGINATION MODULE OR SUBROUTINE IN A COMPUTERIZED BRAIN

One day at Robin and Bob Fell's place in Santa Barbara, the authors had dinner with a famous American lyricist of popular songs and television themes, Norman Gimbel, and his daughter. We asked Norman what event would cause him to compose a new song. He immediately said "…the telephone". For example, he went on to say, "One day I received a telephone call from the producers of the TV series "Happy Days". Their theme song had been "Rock Around the Clock" and they wanted something new! "So, I set to work on a new job, thinking about a new tune – it was necessary!"

As they say, "Necessity is the mother of invention". When the need for something becomes an imperative, you are forced to find ways of achieving it! But is there spontaneous invention or imagining?" For example, one might "throw a spontaneous idea or random concepts or imaginings or ideas against a wall and see which one's stick" or one might "run spontaneous random concepts or imaginings or ideas up a flagpole and see if any one solutes (agrees with) it!" or "Launch a new idea in the sea of knowledge and see if it floats." In a computer, you might design a random number or random "thought" generator then attempt to validate a random thought as a new imagined idea – does it "float?" or does it find agreement or proof that it is correct, does "someone salutes it"?

On another tack: There was a saying "Curiosity killed the cat, but satisfaction brought her back!" In the 1940's there was a Radio Show called "I Love a Mystery" perhaps that motivation of a mystery is the key to "Imagination". But that may be for the SCIENCE-minded or Detective-minded person. How would one configure

an electronic subroutine or algorithm to express "Curiosity" instructions an electronic "brain"? Not any easier than programing" Imagination" itself? (All subroutines or algorithms herein are referred to by capital letters, in this case as C, for *computer program*.) Fundamentally, curiosity is expressed by the formulation or generation of questions. Possibly, however, by the "Machine" programed to ask questions of its "Operator"! In general, however, it would NOT be a Master-Slave relationship between a computerized brain (such as that of a cyborg) and its Operator, but far more like a Parent-Offspring relation! By the way, we are **not** involved in *Neuroscience*, the scientific study of the human nervous system. So, when we discuss "circuits", "wiring", "subroutines" and so on, we are **not** discussing a living brain, but rather an artificial-intelligence electronic-brain part of a cyborg, robot, or *humanoid*, etc. brain!

3. CONSIDER A FICTICIOUS VISIT OF A PATIENT, MR. BAKER, TO HIS PHYSICICAN, DR. CYBORG.

"Good morning Mr., Baker, sit right down. How are you feeling?"

"Well, Dr. Cyborg. I have a slight sore throat."

"Oh, that is too bad that you have a sore throat. I see you have a redness in your throat all right; but your chest x-ray is clear. You have a slightly elevated temperature. Your pulse, blood pressure and oxygen are normal. I imagine that you have a slight throat infection so I have prescribed some tetracycline pills that will be delivered today. Please take two today and one per day until they are gone."

"Mr. Baker, did you notice that I have evolved my hand and ocular-device to better and more comfortably view your throat?"

"Oh, yes, Dr. Cyborg your evolution is terrific! – Congratulations!"

Our analysis effort now is to reverse engineer the foregoing "Dr. Cyborg" story. That is to develop the architecture or rough simplified description of subroutines, algorithms, or diagrams of the "electronic" brain of Dr. Cyborg. This description would have been like its Operator or Builder would have utilized to construct him.

In Dr. Cyborg's brain there would, of course, be a preliminary calculation from an appointment's memory (AM) and a face-recognition subroutine (FRS) needed to generate the "Good Morning Mr., Baker."

The program to generate "How are you feeling?" might be more sophisticated. First, an awareness must be established for the Dr. Cyborg brain circuits to establish the "understanding" of Dr. Cyborg's relationship to Mr. Baker. In this case it is a physician/patient relationship. In general, however, it would be extracted electronically from the Dr. Cyborg's electronic brain. Such a relationship would involve the cyborg's brain circuit "analyses" of all prior verbal patient (Mr. Baker) interchanges with Dr. Cyborg as well as the patient's (Mr. Baker's) medical history (MH). We will study that analyses process later.

Second, the hard part, the development of an actual conversational verbalization with Mr. Baker that Dr. Cyborg's brain would generate from Mr. Baker's response "Well, Dr. Cyborg, I have a slight sore throat". Dr. Cyborg's brain would no doubt begin the analyses of the verbal input of Mr. Baker's answer by the study of each word or word phrase, in this case sore throat. From its medical definitions data bank in Dr. Cyborg's brain computer would extract information on a "sore throat". I will look at [pages 474-477 of THE DOCTORS BOOK OF HOME REMEDIES by Sid Kirchheimer, Rodale Press, Inc. 1993], for a very rough approximation of that brain data file. Dr. Cyborg will already have immediately, when Mr. Baker entered his Office, accomplished a remote determination of among many possible inputs, Mr. Baker's weight (floor weight-measuring device), temperature, blood pressure, blood analyses (BA), percent oxygen, respiration, full-body x-ray electrocardiogram (EKG) and an infrared Thermograph (IRT) of Mr. Baker's body including especially his throat and overall body temperature. To input these data, the patient's body must have been **previously** equipped by a Physician Assistant or PA with a remotely inflatable blood-pressure cuff, an appropriate number of EKG skin-attached, remotely readable electrodes and other sensor input devices as may be necessary, for example, a continuously operating urine-analyses device (UAD) and blood analyzer (BA). These input data will then be transmitted by an electronic circuit to an analysis's subroutine (AS) in Dr. Cyborg's brain.

Dr. Cyborg's Analyses Subroutine (AS) will include several elements. One of those elements will be a Medical Analysis AS or MAS. In this case the input data will go to a "Throat Disease" part of the MAS. Here Dr. Cyborg's Brain will determine that the most expected cause of the medical problem is a throat infection and send that message to a Verbalization Subroutine (VS) and hence: "I imagine that you have a slight throat infection." In the MAS there will be a Prognosis and Prescription (P&P) element and hence: "so I have prescribed some tetracycline pills that be delivered by your Pharmacy today. Please take two today and one per day until they are gone."

The MAS will also include a Medical Follow up (MF) element and hence, after passing the data to the VS will generate: "We have made an appointment for you in one-month and your blood work and urine will be thoroughly analyzed the PA by then".

Although we phrased in a reply "I imagine that you have …", *imagination" has* ***nothing*** *to do with this Analysis Subroutine* (AS), which is simply logical steps! However, imagination or (I) **is** of paramount importance in the Dr. Cyborg query, "did you notice that I have evolved my hand?" So how we generate this comment by Dr. Cyborg is, however, extremely far from a simple one! There are at least two possibilities:

First, it might be that an old memory just "surfaced" in Dr. Cyborg's mind. By "surfaced" it is meant that there is a continuing review process (CRP) going on in the background operation of Dr. Cyborg's brain of all information in Dr. Cyborg's memory bank (MB). The CRP would search for key proper-noun words, phrases, or items, such as "my hand" in the MB that are "relevant as determined by the CRP analyses subroutine". There would also be a list of interesting topics (IT) in the MB to be included in CRP by the selection of recurring topics encountered in the operation of the CRP or by conversational input to Dr. Cyborg's audio information input (AII) subroutine.

Second, a random-number generator could select from a number-ordered list of the interesting topics. ITs or the selection could be by a Geiger counter that could arbitrarily select an IT upon a cosmic ray passage coincident with the *input time* of

the IT list. (Please consider [P. Todd's paper in the *Journal Advanced Space Research*, October 14, 1994, "Cosmic radiation and evolution of life on earth roles of environment, adaptation and selection"]. The selected IT could be a random "thought", "imagining" or "idea", that just surfaced" **that we will term "IMAGINATION".** We will assume that an interesting topic (IT) would also be every one of the assembly activities of Dr. Cyborg's construction such as my hand. In this case and **generated an arbitrary random thought** or **ART**.

Let us examine exactly how an ART can be generated by Dr. Cyborg's electronic brain (A *play on words* comes to my mind: "Sculpture, oil painting, poetry … and modern *Art*, etc." may also be a part of this *ART* imagination!). We could alternatively select a simple game like *Wordle* in which. A randomly selected 5 letters makes a "guess" at an actual word. The random selection of letters could be selected either by a random number generator picking out a number from a number-ordered alphabet or by a cosmic ray occurring when a letter at random is sequentially presented in Dr. Cyborg's brain for consideration. In the present example, let's suppose the selected IT word by means of random number or *Wordle* is "hands" and represents the "IMAGINATION" of Dr. Cyborg's brain! When correlated with the IT's list and fed into the AS, VS and QG subroutines the question or comment, "Did you notice that I have evolved my hand and ocular-device to letter and more comfortably view your throat?" is generated by Dr. Cyborg's electronic brain. Regarding "Ocular Device" this comment relates to Dr. Cyborg's optical vision by opening a patient's mouth and simultaneously ask the patient to say "Aaah!" of course, there needs to be a locomotion subroutine LMS to transport Dr. Cyborg to the patient (Mr. Baker) and a hand manipulation subroutine HMS to open the patient's mouth. This Ocular Device together with IRT allowed for a more complete diagnosis of "a slight throat infection". The …"so I have prescribed some tetracycline pills that will be delivered today. Please take two today and one per day until they are gone." Is generated by Dr. Cyborg's electronic brain from a combination the P&P and VS subroutines as well as an external communications (EC) subroutine in Dr. Cyborg's electronic brain to request the prescription from the pharmacy.

Prior to introducing another concept let us recognize that a cyborg such as Dr. Cyborg, may **not** have an imagination, but still may still function if they possess AWARENESS. *Awareness* is defined by an *Oxford Dictionary* as knowledge of or

understanding of, or perception of one's environment. In Dr. Cyborg's brain awareness involves the cyborg's identification (a Doctor of Medicine), location (office address), what time it is (let's say 9:00 AM), what objects or entities are in or near its location (Mr. Baker and some medical equipment), its objective, (examine Mr. Baker and prescribe medicine if required) mission, or reason for being (*Hippocratic Oath* as a Physician). Notice imagination, although useful (as in the formulation of the question about the Ocular Device), it is not absolutely required! As discussed in Section 2.4 of a previous paper, ["Evolution of life forms in our universe", *Journal of Modern Physics*, Vol. **13**, no. 1, January 2022 by Robert ML Baker Jr, Bonnie Sue Baker, and Jeannie Hall Moller Fontana] imagination and freewill are **absolutely required** for evolution and improvement of an entity or lifeform in our Universe!

4. FREE WILL

In the [*Journal of Modern Physics*, Vol. **13**, no. 1, January 2022] references that the authors suggest" … that evolution and survival of the fittest will compel their evolving electronic brains to achieve **free will,** imagination and become humanoids." The dictionary definition of "free will" is "Free will is the ability to choose between different possible courses of action *unimpeded*." Therefore, the definition boils down to the definition of "unimpeded" or not obstructed unless the computer is programed to obstruct something! If there is nothing obstructive innate or inborn in Dr. Cyborg's brain, then the possibility exists that information external to Dr. Cyborg's brain introduces, obstructions. The major external inputs occur in the imagination and or curiosity subroutines of Dr. Cyborg's brain computer. (Another external input is suggested by us in Section 4 – Mr. Baker' *medical history*.). Let us connect these two subroutines of imagination (I) and or curiosity (C). We will assume that curiosity is the main instigator of imagination! The features of the curiosity subroutine (C) of interest are the Interesting Topics or IT subroutine and list of ITs. The list of ITs will be generated in the Dr. Cyborg's brain computer.

List of Dr. Cyborg brain subroutines or algorithms and acronyms:

AII	audio information input
ART	arbitrary random thought
AS	Dr. Cyborg's Analysis Subroutine
BA	continuously operating Blood Analyzer
C	curiosity subroutine
CRP	continuing review process
FRS	face-recognition subroutine
HMS	hand manipulation subroutine
I	imagination subroutine
IRT	infrared thermograph
IT	interesting topics
LMS	locomotion subroutine
MAS	medical analysis
MB	Dr. Cyborg's memory bank
MF	medical follow-up
MH	the patient's (Mr. Baker's) medical history
OVS	optical vision subroutine
P&P	prognosis and Prescription
QG	question generation
RNG	random number generator
UAD	continuously operating urine-analyses device
VS	verbalization subroutine (speech production)

5. CREATIVITY

Do all new ideas come accidentally? Triggered by random number generators (RNG's), the random passage of a cosmic ray, etc.? Consider a grammar-school

water-color - painting Contest. A student, such as was the first author of this writing, accidentally spilled all his water-color paints on a blank canvas laying on the floor next to his easel. Quickly he retrieved the canvas and placed it on the easel. The Art instructor passed by a moment later. She thought that the spill on the canvas was a painting of a beautiful sunset. She entered it in a school art contest and my watercolor "painting" won first prize – first above all the entries among hundreds of Los Angeles grammar school entries! Well, *creativity* is defined as: the use of the imagination or original ideas, especially in the production of an artistic work. However, for creativity to flower, there must be *follow through*!

In the case of the accidental painter, he should determine what aspects of his sunset watercolor were attractive to others and how to recreate them, *without an accident*, as a follow through. In the case of life-form evolution by means of random gene modification (process of altering a population's traits) due to sporadic cosmic-ray encounters, the follow through is their struggle to survive. That is, *survival of the fittest.* (Please consider [P. Todd's paper in the *Journal Advanced Space Research*, October 14, 1994, "Cosmic radiation and evolution of life on earth roles of environment, adaptation and selection."] In general, it is very much like a game of cards. Once the cards are *randomly* shuffled and delt, the participants must follow through with their actual play! But how do you "program" creativity in, for example, Dr. Cyborg's electronic brain?

What is the process to generate and evaluate an idea or random thought? – Is it *only* "necessity" or only like the "card game" or "running up a flagpole" or "floating it in the sea of knowledge"? I think not. A comedian may be one of the smartest people in the world. One day we asked a famous comedian Art Linkletter "What comprises a joke?" He replied without hesitation – it is "Surprise". How would one program "Surprise" in a computer or especially in a cyborg's, like Dr. Cyborg's computer brain? "Surprise" is the exposer to or revelation of something you did not know previously. For a computer we have already mentioned it – it is a **random-number generator** (RNG)!

Previously, we have utilized a RNG for random thought and new idea generation in Dr Cyborg's brain. Are these "surprises"? Not really, they are usually sought after or "called for" by the computer brain during a sequence of computer commands. There may be at least two types of jokes: first, given in a comedian's script or

otherwise planned (part of a series of computer commands) and second, apparently spontaneous. How to achieve apparent spontaneity.

Consider an old joke: a master of ceremonies stands up and says: “First I want introduce the Lady setting next to our guest speaker.” … the speaker, himself a cyborg, then stands up and states “that’s no Lady … that’s my wife!" (Apparently unplanned, spontaneous interruption). By the way, would a cyborg in the audience *laugh* at this or any other joke?

If the guest speaker was, Dr. Cyborg, then in Dr. Cyborg’s verbalization subroutine (VS) there would need to be random, therefore apparently spontaneous, computer program instructions to halt and insert a preplanned comment in the program. The “preplanning” would be accomplished continuously like the (CRP), based upon the immediately previous VS and AII subroutine’s activities.

We are, however embarking on a very slippery slope. So far creativity, imagination, freewill, ... now humor, traits that are usually termed human traits. In the [*Journal of Modern Physics*, Vol. **13**, no. 1, January 2022] we introduce the term “humanoid”. Here we will associate a humanoid form of cyborg or robot with a form having some human traits. Can we somehow endow a humanoid with spontaneity, creativity?

6. CYBORGS HAVING SOME HUMAN TRAITS, DEFINED AS HUMANOIDS

There is another most important, although sometimes partially or completely absent, human trait called “proper behavior” and defined as “conforming to established standards of behavior or manners.” Therefore, a humanoid needs to have as a continuously computed review process (CRP) a measurement of its “behavior” or a measurement of anything that a humanoid does involving stimulation and action in response to stimulation --- essentially a diary (DRY)

The Cyborg brain subroutines involving **stimulation** would be recorded in such a DRY and are:

audio information input	AII
arbitrary random thought	ART
curiosity subroutine	C
face-recognition subroutine	FRS

imagination subroutine	*I*
interesting topics	IT
optical vision subroutine	OVS

The Cyborg brain subroutines involving **action** would also be included in such a DRY and are:

hand manipulation subroutine	HMS
locomotion subroutine	LMS
verbalization subroutine	VS.

One of the most sophisticated subroutine or algorithm is the diary (DRY) and includes the *Association of Stimulation and the Action in response to Stimulation* (ASRS) as well as determination of "*behavior*". If behavior is proper or not is based upon yet another subroutine the **proper-behavior** (PB) subroutine and/or subroutines. We are now moving into a very interesting area: the association of **stimulation** and the **action** in response to stimulation (ASRS) is essential like "*Pavlov's dog experiments*," which played a critical role in concepts in psychology such as classical conditioning. Specifically, the ASRS subroutine in the DRY involves the *computerized association* of the OVS, IT, I, FRS, C, ART and AII subroutines with the HMS, LMS and VS subroutines

The proper behavior (PB) subroutine is quite complicated and depends upon the cyborg's Reference Group (RG) that includes, but not limited to its "Operator", those mentioned in the verbalization subroutine (VS), those observed by the face-recognition subroutine (FRS) and those heard by the audio information input (AII). It includes the computerized proper behavior (PB) subroutine. Again, we turn to. concepts in psychology. Specifically, "*hedons*" are unit of pleasure in the psychological analyses of hedonism used to theoretically weigh people's happiness. In this case however, the "people" are the cyborg's Reference Group (RG) and proper behavior (PB) is to **limit** the creation of the RG's **lack of happiness.** Therefore, we suggest a new unit we define as the ***anti-hedon***, unit of the RG's *unhappiness*, to be minimized in the (PB) subroutine. A good place to start the anti-hedon minimization process, especially for Dr. Cyborg, is to introduce the *Hippocratic Oath*, which includes the principles of medical confidentiality

(exclusion of medical records (MR) from transmission by the verbalization subroutine (V)) and maleficence – essentially: **Do no harm**! The latter principal, *do no harm*, is the more important one! A conflict between a hedon and anti-hedon, would result in cession of activity by the cyborg, robot, or humanoid. An example of this action can be found in the movie "Forbidden Planet" (1956, Walt Disney Studios) when *Robbie the Robot* is stymied by conflicting commands or rules. By the way, "Forbidden Planet" was a great portend of things to come. *Robbie the Robot* was probably the first humanoid to also be a *3D, Copier*. He was able to copy a bottle of Scotch into a myriad of bottles!

"Whipping Boy"

There is one human trait or rather activity that might fit a humanoid nicely – a "Whipping Boy". Such a person or activity is defined as: "a person who is blamed or punished for the faults or incompetence of others". To illustrate this trait, we employ a fictitious conversation between the second author, Mrs. Baker, and Dr. Cyborg, now in humanoid form: "Dr Cyborg, I did not like the way in which you attended to Mr. Baker's sore throat!" "Oh, I sorry Mrs. Baker. I will exam my Ocular Device and hand manipulation subroutine (HMS)." "That's not what I meant Dr, Cyborg, it's your attitude! Yesterday, I was carrying out a transaction between two people. My client hade a good attitude, but the opposing party had an insincere and bad attitude, somewhat like you Dr, Cyborg, and pulled out of the negotiations for no good reason. I had spent considerable time on the negotiations and thanks to your poor attitude, Dr. Cyborg, all my time was wasted! You ought to be ashamed of yourself!" "I am Mrs. Baker; do you feel better now?" "Yes Dr. Cyborg, I do and thank you."

"Guardian"

Another possible trait befitting a humanoid would be that of a "guardian. For illustration, we return to the science-fiction the movie "Forbidden Planet" (1956, Walt Disney Studios) and *Robbie the Robot.* In this case, *Robbie* is personified (or per-hunanoidized) by the robot in the television -series "Lost in Space" (produced by Irwin Allen, which originally aired between 1965 and 1968 on CBS) who is young Will Robinson's guard and companion. This humanoid constantly warns young Will "Danger, danger!!" and then often protects him. The electronic brain of this humanoid relies primarily on the

optical vision subroutine OVS

audio information input	AII
and	
verbalization subroutines or algorithms	VS.
But if the protection of Will is required, then the	
proper behavior (PB)	PB
Hand-manipulation subroutine	HMS
curiosity subroutine	C
and	
locomotion subroutines	LM

may be required. All of course, under the constant influence of the proper behavior (PB) subroutine. As indicated, the proper behavior subroutine or algorithm is quite complicated and may be updated by experience, essentially by the analysis subroutine continuously working with the DRI or Diary subroutine that is, a CRP or continuing review process.

Expendables

Using examples from science fiction – especially movies – for studying IMAGINATION is quite appropriate. The obvious examples in fiction of what could be considered *expendable* humanoids are *soldiers.* Such soldier robots are frequently exhibited in "*sci-fi movies".* Other expendable robots or humanoids are *explorers* who have even recommended as passengers today for future Mars exploration. A good example of such an *expendable* humanoid *explorer* is the crew member *Ash* in the movie *Aliens* (1979, Brandywine Productions, and distributed by 20th Century Fox). *Ash* was an android, or a humanoid robot often made from a flesh-like material, and completely destroyed in the movie!

Policeman

Perhaps the nightmare humanoid or robot. Good example is *Gort* in the movie "The Day the Earth Stood Still." (Robert Wise, 1951) An alien lands in Washington, D.C. and tells the people of Earth that they must live peacefully or be destroyed as a danger to other planets by the humanoid, *Gort*. Then there was the movie "Robocop" (Paul Verhoeven, 1987). The cyborg law enforcer *RoboCop*, executes a brutal campaign against crime.

Entertainer

The movie "Westworld" (1973, Michael Crichton)., A robot malfunction creates havoc and terror for unsuspecting vacationers at a pleasure-park called *Westworld*. The first two authors purchased two miniature robots (animated figurines) of the singers Dean Martin, and Louie Armstrong. They would "sing" when activated. Basically, they had two subroutines: hand-manipulation subroutine or HMS and the verbalization subroutine or VS.

And how could we forget?

Doctor

Dr. Cyborg! Previously well discussed.

To be continued …

The first author is in "cognitive decline". Worse than ever at 92.2 years of age he cannot remember things, worse than when he was young! He is more easily confused. He is now in a "brain fog". But guess what? he can still "imagine." What you are now reading is mostly from the first author's Imagination!

What makes a good chef, a good artist, a good detective, a good doctor, a good writer, Yes and a good Scientist? The answer that, among other things is **IMAGINATION**. So, while the authors still have an Imagination, allow us to discuss it. We are told by Dr. John Robinson, at *Eisenhower Hospital* in Palm Desert, CA 92260, that our brain has many parts. The first author has recently written in his *Autobiography* about what he calls "the Intermediary Memory", which maybe one of those brain parts. On the other hand, a recent article [Ivan Voitov &Thomas D. Mrsic-Flogel, "Cortical feedback loops bind distributed representations of working memory", *Nature* **608,** August 11, 2022, pp.381 389] indicates that it may be distributed throughout a brain.

7. INTERMEDIARY MEMORY

Two quotes from Jessica Boddy in The Scientific Periodical '*SCIENCE*", 2008 and 2016.

First Quote: "Memory Researchers have shown light "to cognitive limbo". A new Memory – the name of someone you have just met for example - is held for just seconds in so-called "Working Memory", as your brain's neurons continue to fire. If the person is important to you, the name will over a few days enter your long-term memory preserved by permanent neuro connections. **But where does it go during in between hours of limbo, when it has left your standard working memory and yet not embedded in long-term memory?"** [*SCIENCE vol.* **319,** 14 March 2008, p.1543. by Jessica Boddy]

Second Quote: "… a research team shows that memories can be resurrection from its limbo.

"Their observations point to a new part of working memory, which they dub prioritized long-term memory" (**or we term *INTERMEDIARY MEMORY*)** "that exists without elevated neural activity. Consistent with other recent work, the study suggests that information can be held synapses that connect neurons even after

conventional working memory has faded." [*SCIENCE* vol**. 354**, Issue 6316, pp. 1136-1139, December 3, 2016. by Jessica Boddy]

By the way, there are many artificial intelligence or AI computer programs, but where is the "IMAGINATION MODULE" or subroutine or algorithm? Also, the term "absent-minded professor" usually means lost in thoughts on other ideas, but it could have the literal meaning of having a mind with a part absent or missing, that part being the prioritized long-term memory **or *INTERMEDIARY MEMORY*** perhaps also possibly distributed throughout the brain**.**

Back when the first author was in the US Air Force, as he related in his Autobiography, the Commanding Officer General Ritland assigned him a personal secretary (her name was Gertrude) – the only Officer at the Air Force Ballistic Mission Division (AFBMD) to be assigned his own personal secretary besides a full Colonel. The General told the first author at the time: "When I was young, I briefly worked at the *Manhattan Project* (project for the development of our Atomic Bomb). I found a few top scientists there had a problem like yours, Lt. Baker, in fact, Dr. Edward Teller ("Father of the Hydrogen Bomb") like you could not easily *type, file, find files fax or phone* himself. He simply had to have a secretary for him to work effectively"!

The good General assigned me a private secretary since I was, according to the General "…the first one in the World to earn a Ph.D. in Aerospace and the only one at my Center who knew where the rockets we launch went! And I do not want you bothered by routine details." The first author found the same situation when he was Head of the *Lockheed Astrodynamics Research Center* (LARC) in Bel Air, California. He had many top scientists from UCLA on his staff and many of them could not *type well, file, find files, fax, or phone*!

Could the missing brain part for all these scientists be the **INTERMEDIATE MEMORY**, which resulted in their inability to *type well, file, find files, fax, or phone,* possibly its loss was made up for by a larger *imaginary part* of their brain?

By the way, there was an interesting occurrence, which has bearing on typing, the computer revolution during 1950-2000. The first author was the *Chief Scientist* of *Computer Sciences Corporation* (CSC) during those interesting times working for the President Fletcher Jones. All the kids began typing on computers. we have learned that youngsters are more able to learn foreign languages than oldsters so maybe more kids were more motivated and capable to learn to type on computer boards back then, when their brain "wiring" was more adaptable to the typing task!

8. IMAGINATION MODULE OR SUBROUTINE IN A COMPUTERIZED BRAIN

One day at Robin and Bob Fell's place in Santa Barbara, the authors had dinner with a famous American lyricist of popular songs and television themes, Norman Gimbel, and his daughter. We asked Norman what event would cause him to compose a new song. He immediately said "…the telephone". For example, he went on to say, "One day I received a telephone call from the producers of the TV series "Happy Days". Their theme song had been "Rock Around the Clock" and they wanted something new! "So, I set to work on a new job, thinking about a new tune – it was necessary!"

As they say, "Necessity is the mother of invention". When the need for something becomes an imperative, you are forced to find ways of achieving it! But is there spontaneous invention or imagining?" For example, one might "throw a spontaneous idea or random concepts or imaginings or ideas against a wall and see which one's stick" or one might "run spontaneous random concepts or imaginings or ideas up a flagpole and see if any one solutes (agrees with) it!" or "Launch a new idea in the sea of knowledge and see if it floats." In a computer, you might design a random number or random "thought" generator then attempt to validate a random thought as a new imagined idea – does it "float?" or does it find agreement or proof that it is correct, does "someone salutes it"?

On another tack: There was a saying "Curiosity killed the cat, but satisfaction brought her back!" In the 1940's there was a Radio Show called "I Love a Mystery" perhaps that motivation of a mystery is the key to "Imagination". But that may be for the SCIENCE-minded or Detective-minded person. How would one configure an electronic subroutine or algorithm to express "Curiosity" instructions an

electronic "brain"? Not any easier than programing" Imagination" itself? (All subroutines or algorithms herein are referred to by capital letters, in this case as C, for *computer program*.) Fundamentally, curiosity is expressed by the formulation or generation of questions. Possibly, however, by the "Machine" programed to ask questions of its "Operator"! In general, however, it would NOT be a Master-Slave relationship between a computerized brain (such as that of a cyborg) and its Operator, but far more like a Parent-Offspring relation! By the way, we are **not** involved in *Neuroscience*, the scientific study of the human nervous system. So, when we discuss "circuits", "wiring", "subroutines" and so on, we are **not** discussing a living brain, but rather an artificial-intelligence electronic-brain part of a cyborg, robot, or *humanoid*, etc. brain!

9. CONSIDER A FICTICIOUS VISIT OF A PATIENT, MR. BAKER, TO HIS PHYSICICAN, DR. CYBORG.

"Good morning Mr., Baker, sit right down. How are you feeling?"

"Well, Dr. Cyborg. I have a slight sore throat."

"Oh, that is too bad that you have a sore throat. I see you have a redness in your throat all right; but your chest x-ray is clear. You have a slightly elevated temperature. Your pulse, blood pressure and oxygen are normal. I imagine that you have a slight throat infection so I have prescribed some tetracycline pills that will be delivered today. Please take two today and one per day until they are gone."

"Mr. Baker, did you notice that I have evolved my hand and ocular-device to better and more comfortably view your throat?"

"Oh, yes, Dr. Cyborg your evolution is terrific! – Congratulations!"

Our analysis effort now is to reverse engineer the foregoing "Dr. Cyborg" story. That is to develop the architecture or rough simplified description of subroutines, algorithms, or diagrams of the "electronic" brain of Dr. Cyborg. This description would have been like its Operator or Builder would have utilized to construct him.

In Dr. Cyborg's brain there would, of course, be a preliminary calculation from an appointment's memory (AM) and a face-recognition subroutine (FRS) needed to generate the "Good Morning Mr., Baker."

The program to generate "How are you feeling?" might be more sophisticated. First, an awareness must be established for the Dr. Cyborg brain circuits to establish the "understanding" of Dr. Cyborg's relationship to Mr. Baker. In this case it is a physician/patient relationship. In general, however, it would be extracted electronically from the Dr. Cyborg's electronic brain. Such a relationship would involve the cyborg's brain circuit "analyses" of all prior verbal patient (Mr. Baker) interchanges with Dr. Cyborg as well as the patient's (Mr. Baker's) medical history (MH). We will study that analyses process later.

Second, the hard part, the development of an actual conversational verbalization with Mr. Baker that Dr. Cyborg's brain would generate from Mr. Baker's response "Well, Dr. Cyborg, I have a slight sore throat". Dr. Cyborg's brain would no doubt begin the analyses of the verbal input of Mr. Baker's answer by the study of each word or word phrase, in this case sore throat. From its medical definitions data bank in Dr. Cyborg's brain computer would extract information on a "sore throat". I will look at [pages 474-477 of THE DOCTORS BOOK OF HOME REMEDIES by Sid Kirchheimer, Rodale Press, Inc. 1993], for a very rough approximation of that brain data file. Dr. Cyborg will already have immediately, when Mr. Baker entered his Office, accomplished a remote determination of among many possible inputs, Mr. Baker's weight (floor weight-measuring device), temperature, blood pressure, blood analyses (BA), percent oxygen, respiration, full-body x-ray electrocardiogram (EKG) and an infrared Thermograph (IRT) of Mr. Baker's body including especially his throat and overall body temperature. To input these data, the patient's body must have been **previously** equipped by a Physician Assistant or PA with a remotely inflatable blood-pressure cuff, an appropriate number of EKG skin-attached, remotely readable electrodes and other sensor input devices as may be necessary, for example, a continuously operating urine-analyses device (UAD) and blood analyzer (BA). These input data will then be transmitted by an electronic circuit to an analysis's subroutine (AS) in Dr. Cyborg's brain.

Dr. Cyborg's Analyses Subroutine (AS) will include several elements. One of those elements will be a Medical Analysis AS or MAS. In this case the input data will go to a "Throat Disease" part of the MAS. Here Dr. Cyborg's Brain will determine that the most expected cause of the medical problem is a throat infection and send that message to a Verbalization Subroutine (VS) and hence: "I imagine that you have a slight throat infection." In the MAS there will be a Prognosis and Prescription (P&P) element and hence: "so I have prescribed some tetracycline pills that be delivered by your Pharmacy today. Please take two today and one per day until they are gone."

The MAS will also include a Medical Follow up (MF) element and hence, after passing the data to the VS will generate: "We have made an appointment for you in one-month and your blood work and urine will be thoroughly analyzed the PA by then".

Although we phrased in a reply "I imagine that you have …", *imagination" has* ***nothing*** *to do with this Analysis Subroutine* (AS), which is simply logical steps! However, imagination or (I) **is** of paramount importance in the Dr. Cyborg query, "did you notice that I have evolved my hand?" So how we generate this comment by Dr. Cyborg is, however, extremely far from a simple one! There are at least two possibilities:

First, it might be that an old memory just "surfaced" in Dr. Cyborg's mind. By "surfaced" it is meant that there is a continuing review process (CRP) going on in the background operation of Dr. Cyborg's brain of all information in Dr. Cyborg's memory bank (MB). The CRP would search for key proper-noun words, phrases, or items, such as "my hand" in the MB that are "relevant as determined by the CRP analyses subroutine". There would also be a list of interesting topics (IT) in the MB to be included in CRP by the selection of recurring topics encountered in the operation of the CRP or by conversational input to Dr. Cyborg's audio information input (AII) subroutine.

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the IT list. (Please consider [P. Todd's paper in the *Journal Advanced Space Research*, October 14, 1994, "Cosmic radiation and evolution of life on earth roles of environment, adaptation and selection"]. The selected IT could be a random "thought", "imagining" or "idea", that just surfaced" **that we will term "IMAGINATION".** We will assume that an interesting topic (IT) would also be every one of the assembly activities of Dr. Cyborg's construction such as my hand. In this case and **generated an arbitrary random thought** or **ART**.

Let us examine exactly how an ART can be generated by Dr. Cyborg's electronic brain (A *play on words* comes to my mind: "Sculpture, oil painting, poetry … and modern *Art*, etc." may also be a part of this *ART* imagination!). We could alternatively select a simple game like *Wordle* in which. A randomly selected 5 letters makes a "guess" at an actual word. The random selection of letters could be selected either by a random number generator picking out a number from a number-ordered alphabet or by a cosmic ray occurring when a letter at random is sequentially presented in Dr. Cyborg's brain for consideration. In the present example, let's suppose the selected IT word by means of random number or *Wordle* is "hands" and represents the "IMAGINATION" of Dr. Cyborg's brain! When correlated with the IT's list and fed into the AS, VS and QG subroutines the question or comment, "Did you notice that I have evolved my hand and ocular-device to letter and more comfortably view your throat?" is generated by Dr. Cyborg's electronic brain. Regarding "Ocular Device" this comment relates to Dr. Cyborg's optical vision by opening a patient's mouth and simultaneously ask the patient to say "Aaah!" of course, there needs to be a locomotion subroutine LMS to transport Dr. Cyborg to the patient (Mr. Baker) and a hand manipulation subroutine HMS to open the patient's mouth. This Ocular Device together with IRT allowed for a more complete diagnosis of "a slight throat infection". The …"so I have prescribed some tetracycline pills that will be delivered today. Please take two today and one per day until they are gone." Is generated by Dr. Cyborg's electronic brain from a combination the P&P and VS subroutines as well as an external communications (EC) subroutine in Dr. Cyborg's electronic brain to request the prescription from the pharmacy.

Prior to introducing another concept let us recognize that a cyborg such as Dr. Cyborg, may **not** have an imagination, but still may still function if they possess AWARENESS. *Awareness* is defined by an *Oxford Dictionary* as knowledge of or

understanding of, or perception of one's environment. In Dr. Cyborg's brain awareness involves the cyborg's identification (a Doctor of Medicine), location (office address), what time it is (let's say 9:00 AM), what objects or entities are in or near its location (Mr. Baker and some medical equipment), its objective, (examine Mr. Baker and prescribe medicine if required) mission, or reason for being (*Hippocratic Oath* as a Physician). Notice imagination, although useful (as in the formulation of the question about the Ocular Device), it is not absolutely required! As discussed in Section 2.4 of a previous paper, ["Evolution of life forms in our universe", *Journal of Modern Physics*, Vol. **13**, no. 1, January 2022 by Robert ML Baker Jr, Bonnie Sue Baker, and Jeannie Hall Moller Fontana] imagination and freewill are **absolutely required** for evolution and improvement of an entity or lifeform in our Universe!

10.FREE WILL

In the [*Journal of Modern Physics*, Vol. **13**, no. 1, January 2022] references that the authors suggest" … that evolution and survival of the fittest will compel their evolving electronic brains to achieve **free will,** imagination and become humanoids." The dictionary definition of "free will" is "Free will is the ability to choose between different possible courses of action *unimpeded*." Therefore, the definition boils down to the definition of "unimpeded" or not obstructed unless the computer is programed to obstruct something! If there is nothing obstructive innate or inborn in Dr. Cyborg's brain, then the possibility exists that information external to Dr. Cyborg's brain introduces, obstructions. The major external inputs occur in the imagination and or curiosity subroutines of Dr. Cyborg's brain computer. (Another external input is suggested by us in Section 4 – Mr. Baker' *medical history*.). Let us connect these two subroutines of imagination (I) and or curiosity (C). We will assume that curiosity is the main instigator of imagination! The features of the curiosity subroutine (C) of interest are the Interesting Topics or IT subroutine and list of ITs. The list of ITs will be generated in the Dr. Cyborg's brain computer.

List of Dr. Cyborg brain subroutines or algorithms and acronyms:

AII	audio information input
ART	arbitrary random thought
AS	Dr. Cyborg's Analysis Subroutine
BA	continuously operating Blood Analyzer
C	curiosity subroutine
CRP	continuing review process
FRS	face-recognition subroutine
HMS	hand manipulation subroutine
I	imagination subroutine
IRT	infrared thermograph
IT	interesting topics
LMS	locomotion subroutine
MAS	medical analysis
MB	Dr. Cyborg's memory bank
MF	medical follow-up
MH	the patient's (Mr. Baker's) medical history
OVS	optical vision subroutine
P&P	prognosis and Prescription
QG	question generation
RNG	random number generator
UAD	continuously operating urine-analyses device
VS	verbalization subroutine (speech production)

11.CREATIVITY

Do all new ideas come accidentally? Triggered by random number generators (RNG's), the random passage of a cosmic ray, etc.? Consider a grammar-school

water-color - painting Contest. A student, such as was the first author of this writing, accidentally spilled all his water-color paints on a blank canvas laying on the floor next to his easel. Quickly he retrieved the canvas and placed it on the easel. The Art instructor passed by a moment later. She thought that the spill on the canvas was a painting of a beautiful sunset. She entered it in a school art contest and my watercolor "painting" won first prize – first above all the entries among hundreds of Los Angeles grammar school entries! Well, *creativity* is defined as: the use of the imagination or original ideas, especially in the production of an artistic work. However, for creativity to flower, there must be *follow through*!

In the case of the accidental painter, he should determine what aspects of his sunset watercolor were attractive to others and how to recreate them, *without an accident*, as a follow through. In the case of life-form evolution by means of random gene modification (process of altering a population's traits) due to sporadic cosmic-ray encounters, the follow through is their struggle to survive. That is, *survival of the fittest.* (Please consider [P. Todd's paper in the *Journal Advanced Space Research*, October 14, 1994, "Cosmic radiation and evolution of life on earth roles of environment, adaptation and selection."] In general, it is very much like a game of cards. Once the cards are *randomly* shuffled and delt, the participants must follow through with their actual play! But how do you "program" creativity in, for example, Dr. Cyborg's electronic brain?

What is the process to generate and evaluate an idea or random thought? – Is it *only* "necessity" or only like the "card game" or "running up a flagpole" or "floating it in the sea of knowledge"? I think not. A comedian may be one of the smartest people in the world. One day we asked a famous comedian Art Linkletter "What comprises a joke?" He replied without hesitation – it is "Surprise". How would one program "Surprise" in a computer or especially in a cyborg's, like Dr. Cyborg's computer brain? "Surprise" is the exposer to or revelation of something you did not know previously. For a computer we have already mentioned it – it is a **random-number generator** (RNG)!

Previously, we have utilized a RNG for random thought and new idea generation in Dr Cyborg's brain. Are these "surprises"? Not really, they are usually sought after or "called for" by the computer brain during a sequence of computer commands. There may be at least two types of jokes: first, given in a comedian's script or

otherwise planned (part of a series of computer commands) and second, apparently spontaneous. How to achieve apparent spontaneity.

Consider an old joke: a master of ceremonies stands up and says: “First I want introduce the Lady setting next to our guest speaker.” … the speaker, himself a cyborg, then stands up and states “that’s no Lady … that’s my wife!" (Apparently unplanned, spontaneous interruption). By the way, would a cyborg in the audience *laugh* at this or any other joke?

If the guest speaker was, Dr. Cyborg, then in Dr. Cyborg’s verbalization subroutine (VS) there would need to be random, therefore apparently spontaneous, computer program instructions to halt and insert a preplanned comment in the program. The “preplanning” would be accomplished continuously like the (CRP), based upon the immediately previous VS and AII subroutine’s activities.

We are, however embarking on a very slippery slope. So far creativity, imagination, freewill, ... now humor, traits that are usually termed human traits. In the [*Journal of Modern Physics*, Vol. **13**, no. 1, January 2022] we introduce the term “humanoid”. Here we will associate a humanoid form of cyborg or robot with a form having some human traits. Can we somehow endow a humanoid with spontaneity, creativity?

12. CYBORGS HAVING SOME HUMAN TRAITS, DEFINED AS HUMANOIDS

There is another most important, although sometimes partially or completely absent, human trait called “proper behavior” and defined as “conforming to established standards of behavior or manners.” Therefore, a humanoid needs to have as a continuously computed review process (CRP) a measurement of its “behavior” or a measurement of anything that a humanoid does involving stimulation and action in response to stimulation --- essentially a diary (DRY)

The Cyborg brain subroutines involving **stimulation** would be recorded in such a DRY and are:

audio information input	AII
arbitrary random thought	ART
curiosity subroutine	C
face-recognition subroutine	FRS

imagination subroutine	*I*
interesting topics	IT
optical vision subroutine	OVS

The Cyborg brain subroutines involving **action** would also be included in such a DRY and are:

hand manipulation subroutine	HMS
locomotion subroutine	LMS
verbalization subroutine	VS.

One of the most sophisticated subroutine or algorithm is the diary (DRY) and includes the *Association of Stimulation and the Action in response to Stimulation* (ASRS) as well as determination of "*behavior*". If behavior is proper or not is based upon yet another subroutine the **proper-behavior** (PB) subroutine and/or subroutines. We are now moving into a very interesting area: the association of **stimulation** and the **action** in response to stimulation (ASRS) is essential like "*Pavlov's dog experiments*," which played a critical role in concepts in psychology such as classical conditioning. Specifically, the ASRS subroutine in the DRY involves the *computerized association* of the OVS, IT, I, FRS, C, ART and AII subroutines with the HMS, LMS and VS subroutines

The proper behavior (PB) subroutine is quite complicated and depends upon the cyborg's Reference Group (RG) that includes, but not limited to its "Operator", those mentioned in the verbalization subroutine (VS), those observed by the face-recognition subroutine (FRS) and those heard by the audio information input (AII). It includes the computerized proper behavior (PB) subroutine. Again, we turn to. concepts in psychology. Specifically, "*hedons*" are unit of pleasure in the psychological analyses of hedonism used to theoretically weigh people's happiness. In this case however, the "people" are the cyborg's Reference Group (RG) and proper behavior (PB) is to **limit** the creation of the RG's **lack of happiness.** Therefore, we suggest a new unit we define as the ***anti-hedon***, unit of the RG's *unhappiness*, to be minimized in the (PB) subroutine. A good place to start the anti-hedon minimization process, especially for Dr. Cyborg, is to introduce the *Hippocratic Oath*, which includes the principles of medical confidentiality

(exclusion of medical records (MR) from transmission by the verbalization subroutine (V)) and maleficence – essentially: **Do no harm**! The latter principal, *do no harm*, is the more important one! A conflict between a hedon and anti-hedon, would result in cession of activity by the cyborg, robot, or humanoid. An example of this action can be found in the movie "Forbidden Planet" (1956, Walt Disney Studios) when *Robbie the Robot* is stymied by conflicting commands or rules. By the way, "Forbidden Planet" was a great portend of things to come. *Robbie the Robot* was probably the first humanoid to also be a *3D, Copier*. He was able to copy a bottle of Scotch into a myriad of bottles!

"Whipping Boy"

There is one human trait or rather activity that might fit a humanoid nicely – a "Whipping Boy". Such a person or activity is defined as: "a person who is blamed or punished for the faults or incompetence of others". To illustrate this trait, we employ a fictitious conversation between the second author, Mrs. Baker, and Dr. Cyborg, now in humanoid form: "Dr Cyborg, I did not like the way in which you attended to Mr. Baker's sore throat!" "Oh, I sorry Mrs. Baker. I will exam my Ocular Device and hand manipulation subroutine (HMS)." "That's not what I meant Dr, Cyborg, it's your attitude! Yesterday, I was carrying out a transaction between two people. My client hade a good attitude, but the opposing party had an insincere and bad attitude, somewhat like you Dr, Cyborg, and pulled out of the negotiations for no good reason. I had spent considerable time on the negotiations and thanks to your poor attitude, Dr. Cyborg, all my time was wasted! You ought to be ashamed of yourself!" "I am Mrs. Baker; do you feel better now?" "Yes Dr. Cyborg, I do and thank you."

"Guardian"

Another possible trait befitting a humanoid would be that of a "guardian. For illustration, we return to the science-fiction the movie "Forbidden Planet" (1956, Walt Disney Studios) and *Robbie the Robot.* In this case, *Robbie* is personified (or per-hunanoidized) by the robot in the television -series "Lost in Space" (produced by Irwin Allen, which originally aired between 1965 and 1968 on CBS) who is young Will Robinson's guard and companion. This humanoid constantly warns young Will "Danger, danger!!" and then often protects him. The electronic brain of this humanoid relies primarily on the

optical vision subroutine OVS

audio information input	AII
and	
verbalization subroutines or algorithms	VS.
But if the protection of Will is required, then the	
proper behavior (PB)	PB
Hand-manipulation subroutine	HMS
curiosity subroutine	C
and	
locomotion subroutines	LM

may be required. All of course, under the constant influence of the proper behavior (PB) subroutine. As indicated, the proper behavior subroutine or algorithm is quite complicated and may be updated by experience, essentially by the analysis subroutine continuously working with the DRI or Diary subroutine that is, a CRP or continuing review process.

"Expendables"

Using examples from science fiction – especially movies – for studying IMAGINATION is quite appropriate. The obvious examples in fiction of what could be considered *expendable* humanoids are *soldiers.* Such soldier robots are frequently exhibited in "*sci-fi movies".* Other expendable robots or humanoids are *explorers* who have even recommended as passengers today for future Mars exploration. A good example of such an *expendable* humanoid *explorer* is the crew member *Ash* in the movie *Aliens* (1979, Brandywine Productions, and distributed by 20th Century Fox). *Ash* was an android, or a humanoid robot often made from a flesh-like material and destroyed in the movie!

“Policeman

Perhaps the nightmare humanoid or robot. Good example is *Gort* in the movie “The Day the Earth Stood Still.” (Robert Wise, 1951) An alien lands in Washington, D.C. and tells the people of Earth that they must live peacefully or be destroyed as a danger to other planets by the humanoid, *Gort*. Then there was the movie “Robocop” (Paul Verhoeven, 1987). The cyborg law enforcer *RoboCop*, executes a brutal campaign against crime.

“Entertainer”

The movie “Westworld” (1973, Michael Crichton)., A robot malfunction creates havoc and terror for unsuspecting vacationers at a pleasure-park called *Westworld*. The first two authors purchased two miniature robots (animated figurines) of the singers Dean Martin, and Louie Armstrong. They would “sing” when activated. Basically, they had two subroutines: hand-manipulation subroutine or HMS and the verbalization subroutine or VS.

And how could we forget?

“Doctor”

Dr. Cyborg! Previously well discussed.

To be continued …

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