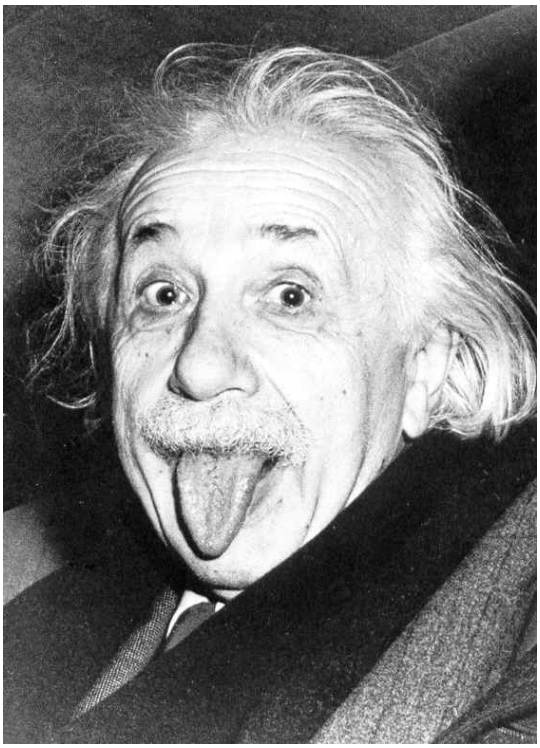

The Einstein Hoax

The joke's on us

"Ein stein" means "one stone", a metaphor for half a brain

"The nation has been on the decline mentally and morally since 1870...Behind the Nazi party stands the German people, who elected Hitler after he had in his book and in his speeches made his shameful intentions clear beyond the possibility of misunderstanding. ... The Germans can be killed or constrained after the war, but they cannot be re-educated to a democratic way of thinking and acting..." Albert Einstein

This "brilliant" jew is, of course, referring to a people who were almost totally destroyed in a world war, have succeeded in ridding themselves of the scourge of jews, and within half a century rebuilt their country to achieve family incomes almost twice as high as ours

"Einstein rarely mentioned those who assisted him. Indeed, in all the famous 1905 papers that he published, only Michele Besso, his friend and sounding board, is mentioned. There is simply no other source material cited in any other of his 1905 papers."

"But the 'energy of the atom' is something else again. If you believe that man will someday be able to harness this boundless energy-to drive a great steamship across the ocean on a pint of water, for instance-then, according to Einstein, you are wrong..." 1934, the Pittsburgh Post-Gazette

This front page article in which Einstein gave an "emphatic denial" regarding the idea of practical applications for the "energy of the atom" demonstrates even further that this jew is a "feeble minded ... moron"

By the last quarter of the 19th century, the Science of Physics was considered to be nearly complete. The electromagnetic equations of James Clark Maxwell had explained electromagnetic radiation and light was considered to be a vibrational wave propagating through a medium called the Aether in a manner similar to the propagation of sound through air. Using Maxwell's Electromagnetic Equations, J. J. Thomson derived the relationship between mass and energy, $E=M*C^2$, in 1888 when the alleged source of that relationship (Dr. Einstein) was still in knee pants. (The author has since received an E-mail which asserts that a Mr. Olinto D. Pretto of Italy published this relationship in 1903. This really doesn't matter too much, what is clear is that ***Dr. Einstein was not the original source of the relationship for which he was credited****.)*

If this jew was so brilliant, why did the US government not tap his talents for the Manhattan Project which SUCESSFULLY developed the atom bomb? Why was GPS a SUCCESS without any consideration for "his theory"? Why were two thirds of his children brain dead? Why did he publish "his" papers under his wife's name? Why did his wife do his math for him, and how did he do his math after he dumped her for a prettier woman? Why did he NEVER cite any prior paper to demonstrate that prior papers were used as references, and not just plagiarized? Why did Time Magazine name him as "person of the year" when he wasn't even in the top 100 of America's favorite personalities? Why was he denied admission to the US, along with all other jews who at that time were "feeble minded ... morons"? Why should this alley cat, who had a downs syndrome child out of wedlock, who got caught in adultery by his wife, who believes that Christ is now boiling in hot semen, who thinks the Germans "cannot be re-educated to a democratic way of thinking and acting", whose disdain for moral character and upstanding principles are so obvious, be presented as a moral example to America's youth?

Niggers in Africa wouldn't even accept him as a role model, so why should we?

This moron's children

1. "Lieserl, the first child of Albert Einstein and Mileva Maric. Nobody really knows what happened to this child; there is a mention in one of the letters to her having scarlet fever and it is believed that the child was put up for adoption in Serbia. Albert never breathed a word about her publicly during his lifetime, which is quite strange." Another View:

"Zackheim argues that toddler was severely retarded and probably had Down syndrome. She contends that Mileva, unable to place the little girl for adoption or bend her to an orphanage, left her with her parents at their home in Serbia's rural Vojvodina region on the fertile Danube plain"

2. Hans Albert Einstein: "Among Professor Einstein's numerous honors and awards were a Guggenheim Fellowship (1953), research awards from the American Society of Civil Engineers (1959 and 1960), The Berkeley Citation from the University of California (1971), the Certificate of Merit from the U.S. Department of Agriculture (1971), and a certificate of recognition for more than twenty years of devoted and distinguished service to *Applied Mechanics Reviews* by the American Society of Mechanical Engineers (1972)"
3. "After Mileva's death a tutor, was appointed to her younger [Albert's second] son [Eduard]; he lived in a sanatorium until his death in 1965."

- Back up copy at http://www.christianseparatist.org/briefs/sb4.02.htm
- Crank dot net on Einstein http://www.crank.net/einstein.html
- The Emperor's New Clothes.
- Einstein's wife, Mileva Maric, did his math for him.
- Another view of the Einstein hoax.
- "Albert Einstein: The Incorrigible Plagiarist".
- Who did Einstein plagiarize from?
- Richard Moody: Einstein the plagiarist.
- Birdman Bryant on Einstein.
- Willie Martin on Einstein.
- Dr. Paul Bowers on the Einstein myth.

- Tom Van Flandern on Einstein.
- Analyzing the personal invectives of einsteinians.
- "Einstein's theories" proven wrong by successful GPS.
- More from H. E. Retic on Einstein's war on common sense.
- FBI file: Einstein denied a visa to enter the US.

The Einstein Time Line

1700	Newton predicts the deflection of light around the sun, something Einstein plagiarized as his 1911 prediction, without citing Newton
1801	Johann Georg von Soldner publishes his predictions which Einstein plagiarized as he predictions 114 years later, not citing Soldnerin "his" 1915 paper
1827	78 years before Einstein gets credit for it, Robert Brown in Scotland explains Brownian Movement
1827	78 years before Einstein gets credit for it, Robert Brown in Scotland explains Brownian Movement
1878	James Maxwell in Scotland publishes Special Theory of Relativity in Encyclopedia Britannica which Einstein publishes as his own in 1905 without citing Maxwell
1879, March 14	Einstein born in Württemberg, Germany
1887	Michelson-Morley experiment suggests there is no ether, an observation made by Einstein in his 1905 papers, with no cites to Michelson or Morley
1988	Heinrich Hertz publishes his paper on the photoelectric effect, a paper which Einstein failed to cite
1889	George Fitzgerald in Ireland publishes his paper about the theory of relativity, a paper which Einstein
1890	Ludwig Boltzmann of Austria and Josiah Gibbs of the US develop the Boltzmann Constant
1892	Hendrik Lorentz in the Netherlands publishes the Lorentz Transformations
1895	At age 16, Einstein fails simple entrance exam to engineering school in Zurich

1896	At age 17, Einstein becomes a high school drop out, his German citizenship is revoked, and he enrolls in the Swiss Federal Polytechnic School in Zurich
1898	Paul Gerber in Germany published the exact equations in Annalen der Physik (also in "Science of Mechanics", a book that Einstein is known to have studied) which Einstein published 17 years later in 1915 as his "perihelion motion of Mercury", in exactly the same journal, with no cites to Gerber, claiming that he was "in the dark", only to confess under pressure to his crime in 1920
1898	Poincare in France wrote the paper on the theory of relativity, which never mentions Einstein, which Einstein plagiarized as one of his 1905 papers without citing Poincare
1900	Max Planck and Wilhelm Wien of Germany develop the quantum theory which Einstein plagiarized as his "Light Quantum" paper in 1905, citing neither Planck nor Wien
1901	At age 22, after five years at Swiss Federal Polytechnic School, Einstein graduated with the lowest grade point average in the class, became a Swiss citizen, and got a job as technical assistant in the patent office
1902	Einstein sires his first mental mushroom, an illegitimate daughter Lieserl, who's believed to have been put up for adoption because she had Downs Syndrome
1903	Olinto de Pretto publishes E=mc^2 in *Atte*, a scientific magazine known to be read by Einstein, which he later claimed as his own work and which he failed to cite
1904	Einstein sires his only normal child, Hans Albert, whose main claim to fame seems to have been to keep up his subscription to Applied Mechanics Reviews for 20 years
1904	Friedrich Hasenohrl of Germany, citing J.J. Thomson of England and W. Kaufmann of Sweden, publishes E=mc^2 in same journal as Einstein plagiariazes as his own in 1905, failing to cite any of the three
1905	**Philipp Eduard Anton von Lenard**, whom Einstein's wife studied under, received a Nobel Prize for discovering the photo-electric effect, which Einstein plagiarizes the SAME year has "his" paper, with no reference to Lenard

1905	At age 26, while still at the patent office, he published 4 groundbreaking essays in the field of theoretical physics and quantum mechanics in Annalen der Physik, gaining him a Ph.D. from the University of Zurich and worldwide support from the Zionists. He included his WIFE Marity's name on the papers who is rumored to have done all his math for him, and gave her all the prize money
1907	J. Precht says of Einstein's ridiculous twist of logic "Perhaps it will prove possible to test this theory using bodies whose energy content is variable to a high degree (e.g., salts of radium)" that such an experiment "lies beyond the realm of possible experience"
1909	At age 30, four years after getting his Ph.D, this genius is still a technical assistant at the patent office, so World Jewry arranges to promote him to associate professor at Zurich University
1910	Einstein sires his second mental mushroom, Eduardo, who dies in a sanatorium in 1965
1915, November 20	David Hilbert presents his paper in Berlin, citing Marcel Grossmann, including precisely the same field equations that Einstein presented as his own 5 days later (2 weeks after it was known that Einstein had a copy of Hilbert's paper, but but Hilbert didn't have a copy of Einstein's paper). Dingle repudiated the special theory of relativity in 1972
1915, November 25	Einstein presents his paper and publishes the General Theory of Relativity based on the mathematics of Marcel Grossmann and Berhard Riemann, first to develop a sound non-Euclidean geometry, which is the basis of all mathematics used to describe relativity.
1919, November 7	London Times begins the jew disinformation campaign, heralding Einstein as a "genius"
1921	Einstein's first visit to the US to promote Zionism
1922	Einstein receives Nobel Prize concerning the photoelectric effect
1932, December 9	Einstein denied a visa to visit the US because of his "communist connections"
1955, April 18	this filthy Jewish demagogue dies
1972	Herbert Dingle refutes the special theory of relativity
1993	Peter Beckman writes that Special Relativity will be dismissed
1995	The Global Positioning Satellite "works fine", in spite of Einsteinians' concerns that they ignored Einstein's "theories"

1998, December 21	Tom Van Flandern publishes in Physics Letters A that the speed of gravity must be at least 20 billion times faster than the speed of light, disproving "Einstein's" theories
1999	Time Magazine puts Einstein on the front cover as "person of the century", even though he wasn't an American, he was an enemy foreign agent, and the American public didn't view Einstein as even one of their most favorte 100 people of the century
2000	Anedio Ranfagni proves that "Einstein's theory" about the constant speed of light is wrong

Einstein's plagiarized papers:

- "Light Quantum" paper
- Dissertation: "A New Determination of Molecular Dimensions"
- "Brownian Motion" paper
- "On the Electrodynamics of Moving Bodies"
- The Special Theory of Relativity based on Lorentz Transformations with no mention of Lorentz who published his paper 13 years earlier.

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http://home.comcast.net/~xtxinc/

"The appearance of Dr. Silberstein's recent article on 'General Relativity without the Equivalence Hypothesis' encourages me to restate my own views on the subject. I am perhaps entitled to do this as my work on the subject of General Relativity was published before that of Einstein and Kottler, and appears to have been overlooked by recent writers." -- Harry Bateman

"All this was maintained by Poincare and others long before the time of Einstein, and one does injustice to truth in ascribing the discovery to him." -- Charles Nordmann

"[Einstein's] paper 'Zur Elektrodynamik bewegter Koerper' in Annalen der Physik. . . *contains not a single reference to previous literature. It gives you the impression of quite a new venture. But that is, of course, as I have tried to explain, not true."* -- Max Born

"In point of fact, therefore, Poincare was not only the first to enunciate the principle, but he also discovered in Lorentz's work the necessary mathematical formulation of the principle. All this happened before Einstein's paper appeared." -- G. H. Keswani

"Einstein's explanation is a dimensional disguise for Lorentz's. . . . Thus Einstein's theory is not a denial of, nor an alternative for, that of Lorentz. It is only a duplicate and disguise for it. . . . Einstein continually maintains that the theory of Lorentz is right, only he disagrees with his 'interpretation.' Is it not clear, therefore, that in this, as in other cases, Einstein's theory is

merely a disguise for Lorentz's, the apparent disagreement about 'interpretation' being a matter of words only?" -- James Mackaye

"The secret to creativity is knowing how to hide your sources." -- Albert Einstein

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"Oh, and Dr. Harvey told me that so far he had found nothing to indicate the physical nature of this particular brain was anything special. But some scientists in California heard about the brain from my story and eventually did some work which showed some anomalies. Anyway, the big excitement for me was seeing those little brain-pieces, each the size of a Goldenberg's peanut chew, bobbing up and down in solution. This changed everything."

It sure did. The brain of the smartest jew in the world is smaller than a woman's--and the smartest jew sin the world is a LIAR, plagiarist, and idiot

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"Unfortunately, Dr. Einstein failed to recognize that Tensor Calculus cannot be used to derive a relativistic theory (as discussed later) and employed that mathematical technique in the theory's derivation. Its use for such a purpose introduced a mathematical error of a type which, if persistently made by a student of Elementary Calculus, would result in a failing grade for the course. As a result of this error, the derivation of General Relativity was impossible in terms of our observable three dimensional Euclidian Space."

Could it be at all possible that this "anti-Semitism" referred to in the following statement, that which got jews kicked out of 86 nations before us, was based on reality and not mythology?:

> Not everybody was enraptured by this general trend of celebrity and idolatry. If you were a conservative, or a German physicist who had won the Nobel prize (as Einstein had not yet done) without having your face decorate magazine covers and being anointed a new Copernicus, there was something vaguely ominous about the brown - eyed face staring out from the newspapers and magazine covers. It was, after all a Jewish face. And the word "relatively" was being heard entirely too often these days in contexts that had nothing to do with moving trains and the speed of light. It was a joke, it was a code, a shorthand for a certain kind of corruption, a moral rot, "the purest subjective idealism", in the words of the London Times, substituting for the pillars of culture and knowledge.
> This was anti Semitism directed at Einstein, and he noticed:
>
> Berlin, Albert had told Ehrenfest late in 1919, was rife with anti Semitism, adding that "political reaction is violent, at least among the intelligentsia." Soon he began to see it everywhere.
>
> There was a large part of the population who were racists, and Einstein had presented himself as a prominent figure for these racists to direct their attention to. Einstein from 1919, he began to notice anti Semitism wherever he went in the world, by this racist faction.

http://itis.volta.alessandria.it/episteme/ep4/ep4maric.htm

Mileva Einstein-Maric

(the author prefers to remain anonymous)

It is a truism to state that Albert Einstein was undoubtedly a genius and a breathtakingly original thinker. Nothing in this article can or should take away from the accomplishments of the most celebrated scientist of all time. But a basic sense of justice and fair play requires that credit must be given where credit is due. It is in that spirit that the world should know the name (and credit should be given) to an equally brilliant scientist, Mileva Maric, the first wife of Albert Einstein.

Albert Einstein met Mileva Maric when he entered the elite Swiss Polytechnic school ("ETH") in Zurich. [An aside: Albert did not initially gain admittance to this elite school and much has been made by Einstein's critics that Einstein was only admitted on his second attempt. While it is true that Einstein did not initially pass the admittance test, this had nothing to do with his mathematical or scientific understanding. In fact, Einstein scored very well in math and science on the admission test (See the

Collected Papers of Albert Einstein, Princeton University Press). Where he failed was in his French test; the Swiss were very picky about French, and although it seems Einstein's French essay was very good, it was not good enough to satisfy the high standards of the picky French professors. Further, Einstein was trying to gain admission to the Swiss Polytechnic at the tender age of 16, without even having first completed high school. The Swiss Polytechnic advised the young Einstein that they were impressed by his math and science scores but he should really finish high school first and then try to gain admission the next year.

Encouraged by kind words of the Swiss Polytechnic, Einstein went back to high school in Germany, got his high school diploma, and was easily admitted on his second attempt to enter the Swiss Polytechnic. See Abram Pais, *Subtle is the Lord…- The Science and the Life of Albert Einstein*, Oxford University Press, 1982]. On entering the Swiss Polytechnic school in Zurich, the young 17 year old noticed the only woman in the class, Mileva Maric, a brilliant Serbian student. Maric remained the only woman studying physics at the Swiss Polytechnic the entire time Einstein was there. Maric was four years Einstein's senior. She was a Serb, an Eastern Orthodox Christian, short of stature, had a limp and was extremely bookish. In addition to taking the exact same course-work in college that Einstein took, Maric studied on her own for one semester in Germany under Phillipe Lenard, the Nobel Prize winning physicist who discovered the photo-electric effect (which was explained in one of the 1905 papers attributed to Einstein).

Soon the two physics students fell in love and began living together, sharing love and textbooks. The work they would do together would change the world of science and re-arrange the universe. Maric is finally beginning to be noticed among scholars. Her achievements were first chronicled by Desanka Trbuhovic-Gjuric in her book *In the Shadow of Albert Einstein*, which, unfortunately, has been published only in German. Because Trbuhovic-Gjuric relied on oral reports of friends of the Einsteins her documentation is not considered rigorous enough. Trbuhovic-Gjuric writes that Maric always considered herself as partner of Einstein, and when asked why she did not insist on more of the credit for their joint work, she replied, "We are one stone; Ein stein."

The Serbian scholar Dord Krstic has written about Maric's close working relationship in an Appendix to the book, *Hans Albert Einstein: Reminiscences of his LIfe and our LIfe Together*, written by Elizabeth Einstein, the wife of Einstein's son, Hans Albert Einstein.

Senta Toremel-Ploetz has written a noteworthy article on Maric, "Mileva Einstein Maric, the woman who did Einstein's mathematics" in *Women's Studies International Forum*, vol. 13, no. 5 (1990).

By far the most interesting and insightful writer on Maric is Dr. Evan Harris Walker, who literally has turned the Einstein image around, crediting Maric with having formulated the Special Theory of Relativity as well as other ideas now commonly attributed to Einstein. Many other popular writers have adopted the insights of Dr. Walker; it is his manuscript *Ms. Einstein* (1990) that remains the leading work so far on the collaboration between Einstein and Maric. Dr. Walker is hereby credited for the information and ideas contained in this article. It was he who first seriously pushed the idea of an Einstein/Maric collaboration. And what a collaboration it was! The *Collected Papers of Albert Einstein* prove to any open-minded person, that Maric did indeed collaborate on the authorship of Einstein's famous papers in 1905. Einstein even uses the word "collaboration". Just a sample quote from Albert to Mileva from their love letters:

"How happy and proud I will be when the two of us together will have brought our work on the relative motion to a victorious conclusion!"

Our work???

This is just one isolated quotation. One should read the entire *Love Letters*, published in the *Collected Papers of Albert Einstein* by the Princeton University Press and separately as *The Love Letters; Albert Einstein and Mileva Maric* edited by Jurgen Renn and Robert Schulmann and translated by Shawn Smith. There you will find that Albert shares all his physics ideas with her and is extremely interested in her opinion. There are literally dozens of examples. See also the copyrighted manuscript by Evan Harris Walker *Ms. Einstein*.

No two physicists ever had a closer relationship: Mileva and Albert ate together, went to school together, shared ideas together, shared textbooks together, slept together, raised children together and discussed physics together. The *Love Letters* prove incontrovertibly that they discussed in great detail the work of physicists and mathematicians like Lenard, Helmholtz, Hertz, Drude, Boltzmann, Kirchhoff, and Planck. In their leisure hours, Mileva often would play the piano accompanying Einstein's violin while they entertained friends, including Einstein's inner circle: Michele Besso, Paul Ehrenfest, Conrad Habicht, Marcel Grossmann, Maurice Slovine. This group eventually became known as "The Olympia Academy."

Senta Troemmel Ploetz, in her excellent paper, quotes Einstein as telling his friends that his wife did his math for him. When one realizes the highly mathematical aspect of the 1905 Special Relativity paper, which relies heavily on derivations of the Lorentz transformations, then one can see the importance of having a first-rate mathematician's help. The *Collected Papers of Albert Einstein* even have a photo-static copy of one of Albert's college notebooks, in which Mileva has gone through and corrected Albert's math! Yet the myth of the isolated Einstein working alone, who all by himself, without help from anyone, wrote four brilliant papers on physics in 1905, endures. These papers included the work on Special Relativity; the photo-electric effect; an explanation of Brownian motion; and the famed formula, $E=mc^2$. All this is detailed in the *Love Letters* and in Dr. Walker's paper, *Ms. Einstein*.

Yet "Einstein Establishment" has been reluctant to recognize the important role Maric played. John Stachel, the first editor of the *Collected Papers of Albert Einstein*, has recently moved away from previous statements that Maric was a mere "sounding board" for Einstein, and has grudgingly stated that she has played a "small but significant role" in Einstein's work.

See http://www.ucl.ac.uk/sts/cain/pubs/rev-pyc.htm.

But was her role really so small?

In addition to the many references to joint work and swapping of textbooks, Dr. Walker has found fascinating evidence that Mileva Maric may have actually put her name on the original manuscript of the Special Relativity. Naturally, the original manuscript for the Special Relativity paper is missing. It was lost during Einstein's lifetime. Yet, Abram Joffe, a summa cum laude Russian physics graduate of the ETH is quoted as having seen the original 1905 manuscript and said it was signed, "Einstein-Marity" (Marity being the Hungarianized version of Maric'; at that time Serbia was under the dominion of Austro-Hungarian empire). Joffe died in 1961. (see *Ms. Einstein* by Evan Harris Walker.)

It is interesting that Joffe would remember the name as "Einstein-Marity" since "Marity" was the Hungarianized version of Maric. Mileva Maric rarely wrote her name as "Marity" except on important formal documents, such as her wedding certificate. That Joffe would remember the name specifically as "Marity" lends credence to his having seen the original Special Relativity manuscript. It is extremely

unlikely that Joffe could have made a mistake.

Moreover, when Albert admitted adultery and divorced Mileva in 1919, he promised that in the event he should win the Nobel Prize all the money-not part of the money but all the money-would go to Mileva. According to the Einstein biography, *Subtle is the Lord*, Einstein kept his promise. When he received the Nobel Prize money in 1922 (he was awarded the prize for the year 1921; the award was announced and he received the money in 1922) Albert did indeed give Mileva all the money from the Nobel Prize. Why all the money?

There are other strange aspects to Einstein's life. Einstein was extremely secretive about his first marriage. It was only in 1987, with the publication of the *Love Letters* between Albert and Mileva that we find out Einstein fathered a daughter, named Lieserl, the first child of Albert Einstein and Mileva Maric. Nobody really knows what happened to this child; there is a mention in one of the letters to her having scarlet fever and it is believed that the child was put up for adoption in Serbia. Albert never breathed a word about her publicly during his lifetime, which is quite strange.

The *Love Letters* also make clear that Mileva Maric was absolutely hated by Einstein's mother, Pauline, who protested to her son that Mileva was, "a book like you." Still, despite his mother's fierce objections, Einstein stubbornly went ahead and married her. It was during this marriage that Einstein is credited with producing the 1905 papers which made him famous.

After they married, Mileva bore Albert two more children, sons Hans Albert and Eduard. Eduard suffered psychological troubles throughout his life, and according to Dord Krstic was even seen by Sigmund Freud.

Maric seems never quite willing to take complete credit for the work she did. Much has been made of Maric never having graduated from the Swiss Polytechnic, implying that she could not have been the intellectual equal of Albert Einstein. This is simply not accurate.

Mileva faced the obvious invidious prejudice of being a woman. Remember, in 1900 women couldn't even vote! Even to be allowed admittance as a woman to the elite Swiss Polytechnic, she had to have been brilliant. Although her grades were comparable to Einstein's grades, Mileva ultimately did not pass her final examinations. It must be noted, however, that at the time she was taking these exams she was late in her pregnancy with Albert's second child (his son, Hans Albert) and also faced the prejudice of her teachers for being both a Slav and a woman. She was, indeed, the only student in Albert's class not to graduate, although she did receive a research position with Professor Weber, which later fell through. Of the students who did actually graduate, Einstein had the lowest grade point average (see *The Collected Papers of Albert Einstein*, Volume 1, which lists the grades of all those who graduated; also see Dr. Evan Harris Walker, *Ms. Einstein*.)

Einstein rarely mentioned those who assisted him. Indeed, in all the famous 1905 papers that he published, only Michele Besso, his friend and sounding board, is mentioned. There is simply no other source material cited in any other of his 1905 papers.

We know from the *Love Letters* that he had a very close collaboration with Maric. Unfortunately, these letters are heavily edited, the omissions being mainly from Maric's letters. Why are Maric's letters so heavily edited? Why are there so many omissions? Will the editors of the *Collected Papers of Albert Einstein* publish or make available Maric's letters in their entirety? Some have felt that Maric's senior thesis at the Swiss Polytechnic might actually have dealt with Relativity theory but, according to correspondence I have had with Professor Bartocci of the University of Perugia, her thesis cannot be located in the Polytechnic's archives.

Einstein's marriage to Maric ended in acrimony. He began treating Maric, for whom he had originally professed such great love, cruelly toward the end of the marriage, even calling her "uncommonly ugly" (see *Collected Papers*). He admitted in a deposition during divorce proceedings (28 December 1918) that he had carried on an adulterous relationship with one of his cousins, whom he later married. During this second marriage, Einstein had numerous affairs, even including -apparently - an affair with a Russian spy! And again, Einstein never breathed a word about having fathered a daughter with Maric.

The full truth of Mileva Maric's role in the work now commonly attributed exclusively to Einstein will only become known when the complete, unedited letters of Mileva Maric are made available to scholars. It is also a fervent hope that the senior thesis of Maric might be found - or at least its subject might become known - because that thesis might actually have been about Relativity theory. Clearly, further research on her life and her physics work needs to be done.

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http://www.wam.umd.edu/~mccaskey/eresp.htm

Just to clarify, this is a response I received to my Einstein biography. The author chose to remain anonymous. I haven't checked the sources, so you may take it or leave it as you will.

Tim McCaskey

Sir,

You requested comments on your Einstein web site, so here are some (please keep an open mind as you read this; apologies for the length):

Your biography on your Web site of A. Einstein is the same old stuff everyone has been reading about him for years and is quite obsolete by now.

For example, you mention Albert Einstein fathered two sons. True, as far as it goes. But why do you not mention that Albert also fathered a daughter, named Lieserl? Do not daughters rate a mention?

Lieserl is mentioned quite prominently in the Love Letters between Mileva Maric (Einstein's first wife and the mother to all his biological children) and Albert Einstein.

The curious fact about Mr. Einstein is that his early teachers were probably correct: they did not view him as particularly bright. When Einstein (on his second attempt) managed to finally enter the Swiss Polytechnic school in Zurich, the young 17 year old quickly realized he was in way over his head. He was extremely quick to glom on to Mileva Maric, a brilliant Serbian student, who was the only woman studying physics at the Swiss Polytechnic ("ETH") the entire time Einstein was there. Maric was four years Einstein's senior. She was a Serb, an Eastern Orthodox Christian, short of stature, had a limp and was extremely bookish. In addition to taking the exact same course-work in college that Einstein took, and living together with him, sharing textbooks, etc., Maric studied on her own for one semester in Germany under Phillipe Lenard, the Nobel Prize winning physicist who discovered the photo-electric effect (which was explained in one of the 1905 papers attributed to Einstein).

She was also absolutely hated by Einstein's mother, Pauline. Still, despite his mother's fierce objections,

Einstein stubbornly went ahead and married her. It was during this marriage that Einstein is credited with producing the 1905 papers which made him famous. All this is detailed in the Love Letters. Further, I suggest you read TIME magazine, April 30, 1990, and the essay by Dennis Overbye "Einstein in Love." This essay refers, without giving attribution, to the work of Dr. Evan Harris Walker and the linguist, Senta Troemmel-Ploetz. If you can find their work anywhere, it is truly an eye-opener.

Prior to their marriage, Mileva Maric gave birth out of wedlock to Lieserl, the only biological daughter of Albert Einstein. Nobody really knows what happened to this child; there is a mention in one of the letters to her having scarlet fever and it is believed that the child was put up for adoption in Serbia. Albert never breathed a word about her publicly during his life-time (which, personally, I find rather strange).

Mileva faced the obvious invidious prejudice of being a woman. Remember, in 1900 women couldn't even vote! Although her grades were comparable to Einstein, Mileva ultimately did not pass her final examinations. It must be noted, however, that at the time she was taking these exams she was late in her pregnancy with Albert's second child (his son, Hans Albert) and also faced the prejudice of her teachers for being both a Slav and a woman. She was, indeed, the only student in Albert's class not to graduate, although she did receive a research position with Professor Weber, which later fell through. Of the students who did actually graduate, Einstein had the lowest grade point average.

But did Albert Einstein---the same man his teachers thought lazy, the same man who after graduating from the ETH could not find a job in physics and was ultimately forced to work for ten years as a lowly patent clerk --- really formulate all by himself the great works in 1905 for which he is credited? Or did his wife, who struggled against the obvious prejudice of being a woman studying science during a highly "male chauvanistic" era, and the added prejudice of being a Slav in Switzerland, collaborate with Einstein?

The Collected Papers of Albert Einstein prove to any open-minded person, that Maric did indeed collaborate on the authorship of Einstein's famous papers in 1905. Einstein even uses the word "collaboration" . Just a random sample quote from Albert to Mileva (published also in the Love Letters):

"How happy and proud I will be when the two of us together will have brought our work on the relative motion to a victorious conclusion!" Our work??? This is just one isolated quotation. Should you read the entire Love Letters you will find that Albert shares all his physics ideas with her and is extremely interested in her opinion. There are literally dozens of examples. See the copyrighted manuscript by Evan Harris Walker "Ms. Einstein". There is also a book by Ann Gabor called, "Mrs. Einstein" which essentially parrots Dr. Walker's work but fails to give him any attribution.

Senta Troemmel Ploetz, in her excellent paper, "Mileva Maric-Einstein: The Woman who did Einstein's Mathematics" quotes from a Serbian biography of Maric, that Einstein himself once told his friends that his wife did his math for him. When one realizes the highly mathematical aspect of the 1905 Special Relativity paper, which relies heavily on derivations of the Lorentz transformations, then one can see the importance of having a first-rate mathematician's help. The Collected Papers of Albert Einstein even have a photo-static copy of one of Albert's college notebooks, in which Mileva has gone through and corrected Albert's math! Yet the myth of the isolated Einstein working alone, who all by himself, without help from anyone, wrote four brilliant papers on physics in 1905, endures. No two physicists ever had a closer relationship: Mileva and Albert ate together, went to school together, shared ideas together, shared textbooks together, slept together, raised children together, and yet the "Einstein Establishment" refuses to acknowledge her as a collaborator in any way whatsoever.

There's more: Naturally, the original manuscript for the Special Relativity paper is missing. It was lost during Einstein's lifetime. Yet, Abram Joffe, a summa cum laude Russian physicist is quoted as having seen the original 1905 manuscript and said it was signed, "Einstein-Marity" (Marity being the Hungarianized version of Maric'; at that time Serbia was under the dominion of Austro-Hungarian empire). Joffe died in 1961. See op cited TIME (April 30, 1990).

Moreover, when Albert admitted adultery and divorced Mileva in 1919, he promised that in the event he should win the Nobel Prize all the money-not part of the money but all the money-would go to Mileva. According to the Einstein biography, "Subtle is the Lord" by Abram Pais, Einstein kept his promise. When he received the Nobel Prize money in 1922 (he was awarded the prize for the year 1921; the award was announced and he received the money in 1922) Albert did indeed give Mileva all the money from the Nobel Prize. Why all the money?

Then I must also mention Olinto De Pretto. Albert Einstein was quite fluent in Italian. According to the already cited Pais biography, when Einstein graduated from high school in Aarau he was required to take exams in both the German language and the Italian language. Out of a maximum score of 6, Einstein received a score of 5 in German (his native tongue) and also a score of 5 in Italian! Of course, Einstein had lived in Italy during his youth, and Einstein's father is buried in Milan. Further, during the very same "anno mirabilis" of 1905, when Einstein published his famous four physics papers in the Annalen der Physik, he also published in the very same Annalen der Physik two reviews of articles written in Italian by Italian physicists. Again, these were reviews of articles written in Italian and were published in the Annalen der Physik in 1905, which shows that Einstein was reading rather deeply the Italian literature in physics at the time. Moreover, Michele Besso, the only person credited in the famous E=mc^2 paper of 1905, was originally from the Veneto region of Italy; his native tongue was Italian. Also, in order for Einstein to gain Swiss citizenship (a requirement for him to work in the Berne patent office since that was a government job) it could only help him if he could show proficiency in Italian, which, along with German and French, is one of the three official languages of Switzerland. Finally, there are still extant postcards written by Einstein in Italian as well as living Italians who spoke to Einstein in his later years who attest to his fluency. There is no doubt that Einstein spoke Italian well.

Why do I emphasize Einstein's fluency in Italian? Because another native of the Veneto region, an industrialist named Olinto De Pretto, had published an article in which De Pretto gave, in its final form, the equation E=mc^2. This article was published in 1903 and published again in 1904; preceding Einstein's 1905 "E=mc^2" paper by at least a year-and-a-half. Dr. Umberto Bartocci, Professor of Mathematics at the University of Perugia, in his book, "Albert Einstein e Olinto De Pretto: la vera storia della formula piu' famosa del mondo" (Albert Einstein and Olinto De Pretto, the true history of the most famous formula in the world) has published De Pretto's article in full. In the article, De Pretto actually comments on how amazing his discovery is. That is a kilogram of any material there is within an extraordinary explosion of energy. De Pretto articulated the formula quite well and realized its significance. This formula, of course, would later be the theoretical basis for the atomic bomb. Throughout all of the famous papers on 1905, Einstein gives no sources or citations. The only credit given to anyone is a brief mention of his friend Michele Besso. Why the lack of citation of any source material?

Dr. Bartocci has made a link between Michele Besso and Olinto De Pretto; however, nobody can absolutely prove that Einstein saw De Pretto's article. Yet based on the Besso link with the De Pretto article, and also that Einstein was well aware of other groundbreaking work by Italian physicists (having read deeply the Italian physics literature), it would seem difficult to deny that Einstein was aware of the De Pretto article. Indeed, when Einstein did publish his famous article in 1905 wherein he gave a variation of the famed "E=mc^2" formula, he titled this "discovery" in the form of a question.

Perhaps he was not quite sure of its significance or perhaps he wanted the title in the form of a question in order to later attribute it to someone else should the formula prove incorrect.

What is absolutely indisputable is that the formula was published, not once but twice, in the Italian physics literature. Its authorship should rightly be credited to the industrialist, Olinto De Pretto.

Recently published letters written by Einstein (see The Collected Papers of A. Einstein) reveal him to be far less than a saintly figure in his personal life. His first wife, Mileva Maric, for whom he had originally professed such great love, he treated cruelly toward the end of the marriage, even calling her "uncommonly ugly". He admitted in a deposition during divorce proceedings (28 December 1918) that he had carried on an adulterous relationship with one of his cousins, whom he later married. During this second marriage, Einstein had numerous affairs, even-apparently-- including an affair with a Russian spy! And again, Einstein never breathed a word about having fathered a daughter with Maric.

The "Einstein myth" has become so ingrained in popular thought that many of the current generations will be loath to part with it. It does make a terrific story: a student whom his teachers thought would not amount to anything, a sloppy dresser who abhored wearing socks or even neatly combing his hair, should later be revealed to be the greatest scientist of all time. A solitary genius who without any significant help from anybody, re-arranged the universe. Like most fine stories that sound too good to be true, the "Einstein myth" is really too good to be true. The Nobel Prize winning chemist Linus Pauling once said (on a completely unrelated topic) that it takes a generation before people will accept a truly new idea. Current generations, weaned on the "Einstein myth" will not bear to part with it. Women and men of newer generations, not weaned on the myth, willing to investigate the evidence for themselves, and not wedded to any ideology or point of view, will approach the issue of Einstein's authorship of the Special Theory of Relativity and the formula "E=mc^2" with fresh eyes. I ask only that the reader keep an open mind.

Thank you for patience.

Race Matters!

Brain Size,Test Scores, Income, Crime, & Civilization

Gould's most inflammatory allegation consists of blaming IQ testers for magnifying the toll of those lost in the Holocaust (p. 263). Here he has followed the lead of Leon Kamin's (1974) The Science and Politics of IQ. The Kamin-Gould thesis is that early IQ testers claimed their research proved that Jews as a group scored low on their tests and that this finding was then conveniently used to support passage of the restrictive Immigration Act of 1924 which then denied entry to hapless Jewish refugees in the 1930s. Gould goes so far as to claim (1996, pp. 195-198; 255-258) that Henry H. Goddard (in 1917) and Carl C. Brigham (in 1923) labeled four-fifths of Jewish immigrants as "feeble-minded ... morons".

It is you who have stood by me in my trials; and I confer a kingdom on you, just as my Father has conferred one on me, that you may eat and drink at my table in my kingdom; and you will sit on thrones judging the twelve tribes of Israel. "Simon, Simon, behold Satan has demanded to sift all of you like wheat," Luke 22:28-31

"Tribes" is the Greek word "phule" which means "an offshoot; i.e., a race or clan".

NEW: Race Calculator

This *is* the book of the generations of Adam: In the day that God created man. He made him in the likeness of God. Gen 5:1

These *are* the generations of Noah: Noah was a just man *and* perfect in his generations, *and* Noah walked with God. Gen 6:9

Because that Abraham obeyed my voice, and kept my charge, my commandments, my statutes, and my laws. Gen 26:5

Be sure of this, that no fornicator or impure man, or one who is covetous (that is, an idolater), has any inheritance in the kingdom of Christ and of God Ephesians 5:5

- Juvenile blacks are 175 more likely than White women to be murderers and 145 times more likely to be murdered.
- Seven American Whites are murdered every day by American blacks.
- Black Americans killed 10 times as many White Americans as Osama bin Ladin.

- Mexicans [erroneously called "hispanics" and listed as "Whites" in many government reports] have a tendency toward crime which is almost as high as that for blacks.
- Race by state:
  - Whites http://www.census.gov/population/estimates/state/rank/white.txt
    - Less Hispanics http://www.census.gov/population/estimates/state/rank/hisp.txt
  - Blacks http://www.census.gov/population/estimates/state/rank/black.txt
  - Asian http://www.census.gov/population/estimates/state/rank/api.txt
  - Indians http://www.census.gov/population/estimates/state/rank/aiea.txt
- The negative effects of profane nigger music.
- The negative annual contribution to GDP of blacks is $843 billion and of Mexicans $128 billion.
- The cranial capacity of blacks and Mexicans is consistent with their lower incomes and test scores and higher crime rates.
- Blacks are 2-3 times as likely per mile driven than Whites to have a fatal traffic accident.
- White men must work 42 days each year *just* to pay the taxes which fund *just* the welfare which is paid *just* to American Blacks.
- Compared to Asian men, black women score lower by 193 GRE Quantitative points, 191 SAT math points, 67 SAT verbal points, 44 NAEP points, 7.4 ACT math points.
- South African girls scored 364 TIMSS math points lower than Japanese boys.
- "Discrimination against blacks" is a tactic by "liberals" to denigrate American Whites.
- The 'regression to the average' explains why black children adopted by Whites don't have higher IQs than the average blacks.

- Annual salaries increase $660 for each 1% increase in brain or head size.
- How blacks destroyed Angola.
- 100 facts and one lie about blacks.
- Quotations of famous black leaders.
- The truth about Africa from an American black: "Thank God for slavery!"
- The breakdown of Zimbabwe.
- Race is not a myth.
- The great black breakthrough: peanut butter.
- The nutso Farrakhan.
- Terminate the 1964 Civil Rights Act, now.
- The "reverse racist" Governor Gilmore of Virginia.
- Whites were more civilized 5,750 years ago than blacks are today!
- History of the White, Caucasian, or Israelite race.

A LESSON: from President Mugabe of Zimbabwe

> Niggers must be shunned, harassed, and driven out of their land. They cannot be afforded any special privileges and will be driven out of the country. Life must be made as unpleasant as possible for them to make them want to leave.
>
> > "They will not be treated like special creatures. Why should they be treated as if they are next to God?"
> >
> > "If anything, they are next to he who commands evil and resides in (the) inferno"
> >
> > "The operation should be thoroughly planned so that niggers are systematically harassed and mentally tortured and their property and businesses destabilised until they give in and give up."
> >
> > "MLK-silencing method", a reference to Martin Luther King who was killed in a mysterious shooting. "You know what happened to MLK" has become a widely used threat.
> >
> > "The opposition should be systematically infiltrated with highly-paid people to destabilise and cause divisions and infighting."

The Statistical Handbook on the American Family from the National Opinion Research Center reports that, compared to White men, black men are:

1. Three times more likely to think that marriage would make their life "much worse".
2. Three times more likely to have grown up fatherless.
3. More than two times more likely to have more than one sex partner.
4. 60% more likely for their exclusive sexual relationship to be sodomy.
5. 30% more likely to condone premarital sex.

This is evidence of a very big difference between races which has serious consequences for society as a whole. The pop theory that these racial differences are due to socialization or environment are now scientifically disputed by the accuracy of the various methods by which to measure cranial capacity, or what the differences between races and sexes are, or how to compensate for various physical factors which influence cranial capacity: *the races are designed differently.*

The proportional differences between races and sexes are equivalent from test to test (helmet size, external head measurement, length plus width of the head, and various methods for measuring the internal cranial capacity) which is proof enough that there are distinct differences between race and sex. J. Philippe Rushton's most recent calculations for cranial volumes of East Asians, Europeans, and Africans of 1,415, 1,362, and 1,268 cc's, respectively, excludes the measurement by sex, so assumptions must be made from other observations which show that the cranial capacity of men is an average of 8-18% larger than that for women. Once adjusted by sex, his figures correlate well with GRE scores (Quantitative, Verbal, and Analytical), TIMSS and TIMSS-R scores, IAEP scores, and in international and US incomes.

- In Europe, men's brains are 11.2% larger than women's brains.
  - Their TIMSS scores are 14.1% higher.
  - Their annual incomes are 42% higher.
- In Africa, men's brains are 11.15 larger than women's brains.
  - Their TIMSS scores are 10.3% higher.

    - Their incomes are 42% higher.
- In Asia, men's brains are 11.1% larger than women's brains.
    - Their test scores are 11.8% higher.
    - Their incomes are 42% higher.
- Asian brains are 3.9% larger than European brains.
    - Their test scores are 12.2% higher.
    - Their incomes are 38% higher.
- Asian brains are 11.6% larger than Africans.
    - Their test scores are 70.8% higher.
    - Their incomes are 30.6X higher.
- European brains are 7.4% larger than Africans.
    - Their test scores are 52.5% higher.
    - Their incomes are 22X higher.

R-squared for race, brain size, test scores, incomes	**Beals, Not Adjusted for Height**	**Rushton, Adjusted for Height**
GRE Quantitative to Annual Incomes	.9481	.6475
Brain Size to GRE Quantitative	.8795	.6859
Brain Size to 12th Grade TIMSS Science*	.8073	.6857
Brain Size to Annual Incomes by Country	.7972	.6475
Brain Size to 12th Grade TIMSS Math*	.7146	.6857
Brain Size to GRE Verbal	.5766	.4654
Brain Size to 8th Grade TIMSS-R Math	.587	.3803
Brain Size to IAEP Math	.5777	.3697
Brain Size to GRE Analytical	.5692	.4385

Note that the highest degree of correlation between cranial capacity and various standardized tests occurs when cranial capacity is not adjusted for height.

While test scores, incomes, and some crime rates are available separately for Mexicans, Puerto Ricans, Other Hispanics, jews, and Indians, brain sizes are not available separately, so these other factors are interpolated to estimate where on the curve they would fall relative to their known traits. Test scores for jews in the US are not reported separately, so the TIMSS test scores for Israel, who are mostly jews, are used to calculate their expected brain size. Brain sizes for White Europeans, East Asians, and Africans are well known, but those for Puerto Ricans, Mexicans, Indians, Other Hispanics, and Others are not, so their expected brain sizes are extrapolated from their separate GRE, SAT, ACT, and TIMSS scores, annual incomes, and known crime rates. The brain sizes of Other Hispanics, Puerto Ricans, and Mexicans are so different that it's extremely misleading to include them as one category in any measurement. Conversely, the similarity between Indians, Mexicans, and jews is so close that it just can't be a coincidence--they are all apparently one single race. While the differences between Asians, Europeans, and Africans have gotten much press and statistical reporting, the possibility that Indians, Mexicans and jews are all one race has gotten absolutely no media coverage.

Race, brain size, and crime rates	Percent pop	Homicide rate	Brain size	SAT Math	GRE quan	Annual US Income
Asians	2.9	0.1	1,415	518	598	$48,614
Whites	69.1	3.8	1,362	490	540	43,287
Jews	1.9	?	1,319	490	541	33,650
Indians	0.8	25	1,314	428	479	30,784
Mexicans	7.2	25	1,313	426	475	33,750
Blacks	12.5	39.9	1,268	376	416	26,608
Others	3.3	1	?	490	541	?

red = interpolated data point

- For annual incomes, see http://www.census.gov/hhes/income/income99/99tableb.html
- For GRE scores, see http://fathersmanifesto.com/gre.htm
- For SAT Scores, see http://fathersmanifesto.com/sat.htm
- For homicide rates see http://www.ojp.usdoj.gov/bjs/homicide/ovrace.txt

Once brain sizes are known, the amazingly high degree of correlation between that and IQs, test scores, crime rates, and incomes becomes evident.

R-squared For Cranial Capacity, SAT and GRE Scores, Homicide Rates, and Incomes, by Race	A) Cranial capacity adjusted for stature	B) Cranial capacity not adjusted for stature	C) A, plus estimated values for Mexicans and Indians
Each 1 cc increase in brain size = $143/year increase in incomes			.9602
Each 1 cc increase in brain size = 1 less homicide per 100k pop	.9952	.9238	.9325
Each 1 cc increase in brain size = a one point increase in SAT scores	.9989	.9691	.9725
Each 1.2 cc increase in brain size = a one point increase in GRE scores	.9735	.9978	.9975
Each 1 point increase in SAT scores = a 1.3 point increase in GRE scores	.9796	.9796	.9802
Each 1 point increase in SAT scores = a $148/year increase in incomes			.969
Each 4 point increase in SAT Scores = one less homicide per 100k pop	.8837	.8837	.9185
Each 4 point increase in GRE scores = one less homicide per 100k pop	.8342	.8342	.9764

The International Correlation Between Brain Size,Test Scores, & Income Estimates in red	Brain Size cc's	Actual 8th Grade TIMSS Math Korea, Belgium, S Africa	Actual 8th Grade TIMSS-R Math Japan, Netherlands, Israel, S. Africa	Actual 8th Grade TIMSS-R Science Japan, Netherlands, Israel, S. Africa	Actual GRE Quan '96-7	GRE Quan '97-8	GRE Quan '98-9	GRE Verbal	GRE Analy	SAT Math 1985	SAT Verb 1986	Annual US Incomes	Annual International Incomes Japan, Switzerland, Mozambique
Asian men	1,472	615	594	569	638	640	643	489	558	540	409	$55,358	$67,001
White men	1,416	548	542	545	586	588	589	507	569	514	454	$50,375	$48,589
Asian women	1,358	598	564	529	572	577	575	485	542	495	399	$37,916	$36,851
Jewish men	1,358		476	478			541					$39,000	$36,800
Mexican men	1,337				517	516	516	448	484	452	392	$35,750	$28,400
African men	1,319	360	280	258	446	448	450	400	422	384	349	$28,075	$2,191
White women	1,308	543	522	520	514	518	516	482	550	466	444	$34,503	$34,460
Jewish women	1,280		456	458			471					$28,300	$14,900
Mexican Women	1,267				451	456	454	428	472	404	372	$25,300	$10,000
African women	1,217	349	270	228	404	405	408	390	418	363	343	$19,230	$500

BLACKS AND CRIME: Blacks are 12.1% of the US population, while American Indians and Asians together are 3.5%. Thus, the FBI's "Whites" [Includes Mexicans, Arabs, Jews, etc.] are the remaining 84.4% of the population.. Blacks are 5.6 times as likely to commit violent crimes as are "Whites." In other words, the average Black is 460% more likely to attack someone than the average "White" is. As compared to "Whites," Blacks are 4.5 times as likely to rape, 5.2 times as likely to commit aggravated assault, and 10.3 times as likely to commit armed robbery. If you had read that Blacks were 30% more likely to be armed robbers than "Whites," you might not have been surprised. In fact, Blacks are 930% more likely to be armed robbers. The 12% of the US population that is Black commits 58% of the armed robberies.

In 1996 law enforcement agencies reported to the FBI that they arrested 14,439 murderers. Of these murderers, 7,928 or 55% were Black. The murderer rate for Blacks is more than 26 per 100,000, while the "White" rate is less than 3 per 100,000. A Black is 9 times as likely to murder as a "White" is. HISPANIC CRIME IS HIGH: Recall that we said that what the FBI calls "Whites" is really a conglomeration of Whites, Hispanics, and others. For data on Hispanic crime, we can look at the FBI's Supplementary Homicide Report, which lists the actual data submitted by 10,000 law enforcement agencies before it is sanitized by the FBI. Five of the states-Arizona, California, Oklahoma, Oregon, and Texas-still keep track of Hispanic crime as a separate category. In one year in these five states, we find under murderers: 1,156 Whites, 2,015 Hispanics, 1,526 Blacks, 134 Asians, and 54 Indians. Adjusted for population, Hispanics are 4.8 times as likely to murder as real Whites are, Blacks are 10 times as likely to murder, and Indians twice as likely as to murder. Before we leave the subject of Hispanics, let us briefly mention what the California Department of Justice reports about murder and robbery. Of the 2,644 California murderers in 1995, 18% or 467 were White. California had 1,250 Hispanic murderers and 794 Black murderers. This data shows that in California, as compared to a White, a Hispanic is 6.1 times as likely to murder, and a Black is 13.2 times as likely to murder.

A California Hispanic is more than 5 times as likely to commit armed robbery as a White, and a Black is nearly 20 times as likely to be an armed robber as a White.

BLACK WOMEN AND MURDER: Removing Hispanics from the FBI's "White" category exposes another interesting fact. In the five states keeping track of Hispanic crime, we found that Black women are actually 5% more likely to murder than White men are. This is also true in almost all parts of the US where separate data is kept on Hispanics or where there are too few Hispanics to obscure the data. For example in seven Southern states, Black women are 15% more likely to murder than White men are.

Since we said that in the South, Black women are 15% more likely to murder than White men are, to be fair we must compare White women to Black men. In these same seven Southern states, a Black man is 52 times more likely to murder than a White woman is. Stated as a percentage, a Black man is 5200% more likely to murder than a White woman is.
OUTSIDE EVIDENCE SUPPORTS THE FBI DATA: Professor Levin [in his 1997 book, "Why Race Matters: Race Differences and What They Mean"] reviews some of the statistics on Black criminals that you may have heard. For example, a Black is 7.8 times as likely to be in prison as a "White." Over 30% of the Black men between 23 and 29 are imprisoned for a felony. In major cities, it is worse. At any one time 42% of the Black males in Washington DC are in jail, on parole, on probation, or being sought by police. In Detroit, the number is somewhere between 45% and 50%. In Baltimore, it is 56%. Another study found that in one year, 25% of the Black men in Little Rock, Arkansas were arrested for a felony. Yet, another study shows that in the District of Columbia, 85% of the Black males will be arrested at some point in their life.
INTERRACIAL CRIME: Perhaps the best place to look at interracial crime is in the South, because the media depicts the South's Whites as a bunch of violent gun-toting, Black-hating rednecks. In one year in seven Southern states, Blacks killed 226 Whites while Whites killed only 66 Blacks. After adjusting the data for population size, it shows that a southern Black is 11.2 times as likely to murder as a southern White is. Table 2.8 of the FBI's 1996 Uniform Crime Report, lists interracial crime figures for the US as a whole. It shows that adjusted for population size, a Black is nearly 16 times as likely to murder a "White," than visa versa.

Here are some of the results cited in the university studies reviewed by Dr. Levin. Note that we don't know how each researcher defined White. One study shows that in the South, a Black is 10 times more likely to murder a White than visa-versa. A second study demonstrates that proportionally, Blacks kill 22 times as many Whites as Whites kill Blacks. A third study shows that Blacks are about 11 times more likely to rape a White than a White is to rape a Black. He concludes that evidence exists to support the stereotype that Black men lust after White women.

Professor Levin cites additional research showing that less than 3% of White crime is directed against Blacks, while one-half to two-thirds of the Black wave crime is directed against Whites. In yet another study, he found that the average Black is 25 times more likely to assault a White than the average White is likely to assault a Black.

Expressions of Ethnic Animosity

Politically Correct Hate Speech

Walter Mosley (President Clinton's favorrite mystery writer, in his novel) "Dad?" "Yes?" "Why do black men always kill each other?" (Long pause.) "Practising." After repeating these lines to him, I ask, "You mean, practising to kill whites?" He smiles that crooked half-smile again, nods and says, "Yup." (added 2/3/00)

Susan Sontag (white intellectual) "The truth is that Mozart, Pascal, Boolean Algebra, Shakespeare, parliamentary government, baroque churches, Newton, the emancipation of women, Kant, Marx, and Ballanchine ballets don't redeem what this particular civilization has wrought upon the world. The white race is the cancer of human history." (added 1/30/00)

Buffy Sainte-Marie (American Indian folk singer) "Here the melting pot stands open -- if you're willing to get bleached

first" (added 1/30/00)

John Updike (white novelist) "Americans have been conditioned to respect newness, whatever it costs them" (added 1/30/00)

James Baldwin (black novelist) "The future is ...black" (added 1/30/00)

Louis Farrakhan (black religious leader) "The Titanic was a great ship, but is was captained by one depicted as being arrogant, and warnings of an iceberg were not heeded. America is like that great ship. Unfortunately, at the helm may be a proud captain. And black people could become the iceberg that causes the sinking of this great ship called the United States of America." (added 1/30/00)

Leroi Jones (black writer) "If you are black the only roads into the mainland of American life are through subservience, cowardice and loss of manhood. These are the white man's roads." (added 1/30/00)

Thurgood Marshall (black Supreme Court justice) "Some years ago I said in an opinion that if this country is a melting pot, then either the Afro-American didn't get in the pot or he didn't get melted down." (added 1/30/00)

Sonny Carson (black activist in New York when asked if he was anti-Semitic) "I am anti-white. I don't limit my 'anti' to just one group of people." [Mark Mooney, "Ex-Dinkins Organizer Boasts He's 'AntiWhite'" ***New York Post***, October 21, 1989, p. 3.]

Miles Davis (black jazz musician) "If somebody told me I had only one hour to live, I'd spend it choking a white man. I'd do it nice and slow." [Miles Davis Can't Shake Boyhood Racial Abuse, ***Jet*** March 25, 1985.]

Eldridge Clever (former Black Panther leader on why he raped white women) "Rape was an insurrectionary act. It delighted me that I was defying and trampling upon the white man's law, upon his system of values, and that I was defiling his women . . . ." [Eldridge Clever, ***Soul on Ice***, McGraw-Hill, 1968, p.14.]

Gus Savage (former U.S. Representative from Chicago to a white member of the press) "I don't talk to you white motherf*ckers. . . . You bitch motherf*ckers in the white press. . . . F*ck you, you motherf*cking *sshole . . . white devils." [Marilyn Rauber, "Reporter Says Black Rep Hurled Racial Slurs," ***New York Post***, June 27, 1991, p. 18.]

Chino Wilson (in an editorial in the ***Daily Collegian***, campus newspaper at Penn State University) "After looking at all the evidence there is only one conclusion: white people are devils . . . . I believe that we must secure our freedom and independence from these devils by any means necessary, including violence. . . . To protect ourselves we should bear arms (three handguns and two rifles, maybe an M-16) immediately and form a militia. . . . So black people, let us unite, organize and execute." [Chino Wilson, "African American Students Should Not Trust 'Devilish' White People," ***The Daily Collegian***, Penn State University, January 28, 1992.]

Khalid Abdul Muhammed (former assistant to Louis Farrakhan - current leader of the New Black Panther Party) -'Hollywood is owned by these so-called Jews. Look at the movies they make about us, Black people killing Black people. Let's make some revolutionary movies where we kill white people in the movie. Kill 'em so hard you have to cover up your popcorn from the blood spraying out of the screen." [Speech at San Francisco State University, May 21, 1997.]

Khalid Abdul Muhammed (on what South African blacks should do to any whites who refuse to leave South Africa): "We kill the women. We kill the babies. We kill the blind. We kill the cripples. We kill them all. . . . When you get through killing them all, go to the goddamn graveyard and kill them a-goddamn-gain because they didn't die hard enough."[November 29, 1993 speech at Kean College in Union, New Jersey.]

Mary Frances Berry (current head of U.S. Commission on Civil Rights) - "Civil rights laws were not passed to protect the rights of white men and do not apply to them." [***Civil Rights Under Reagan***, San Francisco, ICS Press, 1991, p. 141.]

Augustin Cebada (Head of the Brown Berets, a Hispanic activist organization at a July 4, 1996 rally) - "We're here today to show L.A., show the minority people here, the Anglo-Saxons, that we are here, the majority, we're here to stay. We do the work in this city, we take care of the spoiled brat children . . . we are the majority here and we are not going to be pushed around."

Augustin Cebada "Go back to Simi Valley, you skunks! Go back to Woodland Hills! Go back to Boston! Go back to Plymouth Rock, Pilgrims! Get out! We are the future. You are old and tired. Go on. We have beaten you. Leave like beaten rats. You old white people, it is your duty to die. . . ." [Quoted in Barbara Coe, ***Reconquista, The Takeover of America***, California Coalition for Immigration Reform, 1998, p. 20.]

Prof. Jose Angel Gutierrez (University of Texas, Arlington) "We have an aging white America. They are dying. They are shitting in their pants with fear! . . . I love it!" - [Speech of Jan. 1995, quoted in Coe, ***Reconquista***, p. 16.]

Supreme Court Justice Thurgood Marshall (in a conversation with Justice William Douglas about racial preferences) "You guys have been practicing discrimination for years. Now it is our turn." [***William O. Douglas, The Court***

Years 1939-1975, New York, Random House, 1980.]

Bell Hooks (black professor of English at City College of New York) "I am writing this essay sitting beside an anonymous white male that I long to murder." [From her book ***A Killing Rage***, quoted by David Horowitz in ***Hating Whitey***, Spence Publishing, 1999, p. 31.]

Sister Souljah (rap artist and black activist) "If black people kill black people every day, why not have a week and kill white people." [R.W. Apple "Jackson Sees 'Character Flaw' in Clinton's Remarks on Racism, ***New York Times***, June 19, 1992.]

Ice Cube (black rapper and actor, on the anti-Korean album ***Death Certificate***)
"So don't follow me up and down your market.
or your little chop suey ass will be a target.
So pay your respects to the black fist
or we'll burn your store right down to a crisp."
[Eric Briendel, "Rap Star to Koreans: 'We'll Burn Your Stores,' " ***New York Post***, Dec. 5, 1991, p. 29.]

Amiri Baraka (black poet and writer)
"You cant steal nothin from a white man, he's already stole it he owes
you anything you want, even his life. All the stores will open up if you
will say the magic words. The magic words are: Up against the wall
motherfucker this is a stick up!"
[Quoted in Anne Wortham, ***The Other Side of Racism***, Ohio State University Press, 1981, p. 257.]

Mario Obledo - (1998 Presidential Medal of Freedom recipient and former head of Mexican American Legal Defense and Education Fund - MALDEF) "California is going to be a Mexican state, we are going to control all the institutions. If people don't like it they should leave." [Tom Leykis Radio Show, June 7, 1998.]

Malcolm X - "The death of over 120 white people is a very beautiful thing." [Speech in Los Angeles on June 3, 1962 upon learning of a plane crash. He also said on numerous occasions, "The white man is the devil."]

Rev. James Cone - "What we need is the destruction of whiteness, which is the source of human misery in the world." [Quoted in David Horowitz, ***Hating Whitey***, Spence Publishing, 1999, p. 44.]

Art Torres (former chairman, California Democratic Party) - "Remember, [Proposition] 187 [the measure to cut public benefits to illegal aliens] is the last gasp of white America." [***The Social Contact***, Summer 1998, p. 290.]

Willie Brown (Mayor of San Francisco to a white parent complaining that affirmative action would penalize his children) "I don't care about your idiot children." [***The Social Contract***, Summer 1998, p. 290.]

Source: American Renaissance

"LIBERALS" ADMIT: JEWS ARE A RACE

"Bob LeChevalier" <lojbab@lojban.org> wrote in message
news:vb4lou440cptd3gche79p9k2mkps7342l8@4ax.com...
> "John Knight" <jwknight@polbox.com> wrote:
> >> Nonsense. There is no gene that "gravitates someone towards a book".
> >> It is not transmittible by descent.
> >
> >Only the race called jews adhere to, accept, practice, believe in, promote,
> >and promulgate the "principles" of the Talmud
>
> duh Why would that be? I wonder. It is part of their culture
>
> >But on TOP of that, the definition for "race" that YOU provided states
> >clearly that a "race" is "a family, tribe, people, or nation belonging to
> >the same stock".
>
> That is ONE meaning of race. Not all usages of race fit that
> definition. Indeed most of them don't. Go learn how to use a

> dictionary properly.
>

You've claimed for a long time that jews are not a race.

Now you're arguing just as vehemently that they are a race by only ONE definition of race?

Then you suggest someone else should go "use a dictionary properly"?

YOU provided this dictionary definition. Nobody challenged it, not even YOU. By at least ONE definition that you posted, jews are a RACE.

But you STILL deny jews are a race based on the assertion that jews don't fit EVERY definition of "race"?

No wonder "liberals" don't have the first clue about the world they live in.

Just to set the record straight, here again is the definition of race that YOU provided:

>I have no idea what dictionary you pulled this from. Here is
>Mirriam-Webster:
>Main Entry: 3race
>Function: noun
>Etymology: Middle French, generation, from Old Italian razza
>Date: 1580
>1 : a breeding stock of animals
>2 a : a family, tribe, people, or nation belonging to the same stock b
> : a class or kind of people unified by community of interests,
> habits, or characteristics <the English race>
>3 a : an actually or potentially interbreeding group within a species;
> also : a taxonomic category (as a subspecies) representing such a
> group b : BREED c : a division of mankind possessing traits that are
> transmissible by descent and sufficient to characterize it as a
> distinct human type

You have finally agreed that jews are a race by claiming that they are an "ethnos" [which is Greek for race].

But jews are also a race because they are "a family belonging to the same stock", "a tribe belonging to the same stock", "a people belonging to the same stock", and now "a nation belonging to the same stock", "a class or kind of people unified by community of interests, habits, [AND]characteristics", "an actually or potentially interbreeding group within a species", AND "a division of mankind possessing traits that are transmissible by descent and sufficient to characterize it as a distinct human type".

Every single one of these definitions for race fit the jews to a tee.

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The Einstein Hoax

The Disastrous Intellectual War on Common Sense

By- H. E. Retic

Published by-

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West Caldwell, NJ

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- **The symbol "*" represents a multiplication.**
- **The symbol "^" represents the raising of a number to a power.**
- **The author relies upon the "No Break" command of HTML to prevent equations and expressions from being split between lines by the browser's wordwrap function.**

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The presentation of a text containing Tables and/or Figures is compromised by the capability of browsers to allow the user to vary the size of the presentation from an agreed upon standard. As a result, it is necessary to incorporate "page break" commands within the text so that embedded tables and diagrams will not split between two separate printed pades. This will have no effect on texts read directly from the screen but will cause some of the printed pages to contain a blank space at their end to allow the tables and/or diagrams to start at the top of the nect page. Ir is recommended that the printer margins be set at 0.75 inches at the top, right and bottom and at 1.0 inches at the left. Your browser's text size should be initially set at MEDIUM. To test for a suitable printed page size access Print Size Test Page. If printing does not fill page properly, try adjusting the top and bottom margins. To copy text and diagrams to a file "Save As" "Complete HTML Text File".

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Chapter 1 - Introduction

1.1- As a young man, the author had sufficient arrogance to believe that, while a lack of time prevented an individual from understanding all of Nature, there was no aspect of Nature that could not be understood at the intuitive level by a reasonably intelligent and adequately motivated individual. As a result the statements which appeared in the texts of the time that the effects defined by the Special and General Theories of Relativity were beyond such an understanding and could only be treated by mathematical manipulations were a challenge. Inherently, mathematics is a science of how much and not of how come, and it was the how come that the author wished to understand. To meet that challenge, the author proceeded to study the concepts involved with the good faith belief that they had been well thought out and well verified by men far better trained and wiser than himself. However, the deeper the author probed, the more disillusioned he became. It became more and more apparent that the effects represented were quite easily understood at the intuitive, or common sense, level and that the reason that they appeared mysterious was that those who purported to be experts did not actually understand the subject matter and that their assertions of its incomprehensibility were rationalizations to cover their own limitations. It turns out that the subject matter is readily understood by anyone with a good ability to visualize physical reality and who is familiar with Physics and Calculus at the college freshman level.

1.2- The author's initial confusion resulted from the fact that, while Special Relativity was presented as the epitome of physical wisdom, initially it was impossible for him to find a meaningful distinction between it and the Lorentz Transformation-Aether Theory which had preceded it by two years. It finally dawned on the author that the Special Theory of Relativity was actually the Lorentz Transformation-Aether Theory without the constraint imposed by the requirement of an absolute velocity reference (the Aether). Then, contrary to the rules of evidence which would be employed in a court of law, the academic community forced the acceptance of the idea that, since both theories had demonstrated that our absolute velocity through space could not be observed, the Aether had no significance and was not to be used as the basis for a physical theory. This position was taken even though Dr. Einstein had maintained a belief in absolute time (equivalent to a belief in the existence of the Aether) for about 25 years after Special Relativity had been published. He had also warned that the non-existence of the Aether had not been proven, what had been proven was that its use was not necessary in mathematical analyses of physical processes.

1.3- Both Special Relativity and the Lorentz Transformation-Aether Theory demonstrated that the observed velocity of light was independent of the velocity of its source. Therein lies the rub. Such a

result is obvious if light is a wave propagating through a medium (the Aether). By abolishing the Aether, Special Relativity lost the velocity reference the Aether represented and asserted instead that light propagated as ballistic particles (photons) through empty space. Advocates of Special Relativity provided no explanation as to how Nature performed such a remarkable feat of speed control without using the Aether as a reference and instead, they strongly asserted that any doubts a questioner had resulted from his limited intellectual capacity rather than from a legitimate concern. That attitude has run into some trouble in recent years, observations of the radiation background of space have shown that the Earth has a velocity of 300 kilometers per second with respect to that background, and experiments by quantum physicists have demonstrated that our absolute velocity through space can be measured in the laboratory. As we shall see, these observations make an overwhelmingly strong argument for the validity of the Lorentz Transformation-Aether Theory and the artificiality of the Special Theory of Relativity.

1.4- The author's disillusionment became deeper when he began to study General Relativity. That theory supposedly explained gravity as a phenomena resulting from a curving of space caused by the presence of matter. However, General Relativity blithely fails to discuss the most significant characteristic of gravity, the force which presses you to your chair. Compared to the need to explain that force and the energy it represents, the corrections General Relativity provides to the Newtonian orbits of planets, the path of starlight, or the rate of passage of time are rather trivial. Incredibly, not only does General Relativity fail to explain the source of that force (and the energy it implies), many texts on the subject actually deny that the force exists. When the derivation of General Relativity is examined carefully, it is found to contain a fundamental error of a type which would not have been tolerated if it had been made by a college freshman who was studying Calculus. Even with that error, the truth of the basic premises of General Relativity (the Principles of Relativity and of Equivalence) insured the error would not be revealed by observations made in the weak gravitational field of the Sun or by observations of a distant binary star system. In order to partially compensate for the effects of his mathematical error, Dr. Einstein introduced the artificiality of curved space. This concept has had the unfortunate effect of leading a large number of highly trained astronomers and cosmologists down the garden path and led to the absurdities of Black Holes, Wormholes, and Singularities. Dr. Einstein may have recognized the existence of a defect(s) in General Relativity since he is reported to have been uneasy about its extension into regions of intense gravitational fields.

1.5- The author's disillusionment with the job performance of those from whom he had hoped to learn led him to study the subject matter by starting from basics using an approach which was suitable for the analysis of relativistic phenomena (i.e.- velocity effects and gravity effects). This capability is not possessed by the Tensor Calculus commonly used by physicists and which allows them to by-pass the need to understand the phenomenon they were investigating. The author recognized, as does a surveyor who routinely corrects his observations for the effects of ambient temperature on the length of his measuring tape, that observations made between reference frames differing in velocity and/or elevation require a correction for the effects of that difference on the size of the units of measurement he employs. Only after appropriate corrections have been made can valid conclusions be drawn as to what actually occurs between different velocity and/or elevation reference frames. The required technique for studying relativistic effects is Dimensional Analysis which was developed in the 19th century to facilitate experiments in hydraulic engineering. The Lorentz Transformations of both the Lorentz Transformation-Aether Theory and Special Relativity provide the information required to allow the use of Dimensional Analysis for a rigorous analysis of the effects of velocity. To examine the gravitational field, it was necessary for the author to devise a means of deriving gravitational equivalents of the Lorentz Transformations that did not include the loop of circular reasoning that caused General Relativity to be defective.

1.6- The real test of an expert's knowledge is his ability to make his subject matter intuitively understandable to an intelligent layman. If he cannot do so, there is only one possible reason. Regardless of his credentials and his acceptance by his peers, the reason is that he doesn't actually understand his subject matter. In the remainder of this text, the writer hopes to be able to pass that

test of understandability and provide the reader with a useful insight into the nature of space, time, matter, gravitation, and cosmology in a manner which is consistent with the physical laws taught in undergraduate level physics. The author's tools are his simple minded belief that there is only one reality and everything we accept as true about that reality must be consistent with everything else we accept as true and his simple minded belief that Nature is constructed in the most straightforward manner possible. With that in mind, the author hopes that what follows will be both instructive and interesting to the reader and capable of raising the blood pressure of the academic community. Enjoy!

1.7- (Note: A rigorous derivation of the gravitational field and its effects on cosmology is provided in the author's text "Gravity" copyrighted in 1988. This text was sent, at the time, to individuals identified as having a reputation in the field. Since then, the author has read some of the conclusions presented in "Gravity" in books subsequently written by a few of those individuals. Due to the controversial nature of this text, unless required by the subject matter, the names of individuals and publications have been omitted in order to prevent their possible embarrassment.)

Chapter 2 - Historical Background

2.1- By the last quarter of the 19th century, the Science of Physics was considered to be nearly complete. The electromagnetic equations of James Clark Maxwell had explained electromagnetic radiation and light was considered to be a vibrational wave propagating through a medium called the Aether in a manner similar to the propagation of sound through air. Using Maxwell's Electromagnetic Equations, J. J. Thomson derived the relationship between mass and energy, $E=M*C^2$, in 1888 when the alleged source of that relationship (Dr. Einstein) was still in knee pants. (The author has since received an E-mail which asserts that a Mr. Olinto D. Pretto of Italy published this relationship in 1903. This really doesn't matter too much, what is clear is that Dr. Einstein was not the original source of the relationship for which he was credited.) A difficulty which remained was that light was known to be a shear vibration acting in a plane perpendicular to the direction of propagation rather than a compressional vibration acting in the direction of propagation. Since shear vibrations cannot propagate through a fluid, it was recognized that the Aether must be solid. This conclusion raised the interesting question of how material particles could move through a solid without resistance. Even so, the concept of the Aether was so persuasive that the next logical step was an attempt to measure the effects of changes in the velocity of the Earth as it traveled through the Aether in its orbit around the Sun.

2.2- The most significant of the experiments was conducted by the the team of Michelson and Morley. They devised an experiment using optical interferometry which attempted to measure the difference in the velocity of propagation of light between two mutually perpendicular directions. To everyone's chagrin, the experiment produced a null result! No interference effects were observed as the Earth changed its velocity through the hypothetical Aether by 36 miles per second over the course of a year even though the precision, accuracy, and stability of the experimental setup was more than adequate to reveal the anticipated effects.

2.3- Initial attempts at explaining the null result of the Michelson-Morley Experiment produced unsuccessful concepts such as the Aether Drift Theory in which the Aether was presumed to be carried along with the Earth, but by 1903 the Lorentz Contraction-Aether Relativity Theory was published. The key to this theory was the Fitzgerald Contraction which asserted that the length of material objects, in the direction of motion, was reduced as a function of the velocity of the object through the Aether in proportion to $(1-V^2/C^2)^{0.5}$ but were unaffected in directions perpendicular to that velocity. It was immediately recognized by Larmor that the Fitzgerald Contraction required an equivalent slowing in the rate of passage of time. Since, by that time Lorentz had used the known equivalence between mass and energy to provide the effects of velocity on mass, $1/(1-V^2/C^2)^{0.5}$,

transformations involving the expression $(1-V^2/C^2)^{0.5}$ became known as Lorentz Transformations. Collectively, these transformations became known as the Lorentz Transformation-Aether Theory. A more meaningful name would seem to be the Aether Relativity Theory, and it will be referred to by this name where necessary to distinguish it from the Special Theory of Relativity. Under this theory, velocity through the Aether caused measuring instruments to change their calibrations in obedience to the Lorentz Transformations. Those changes in calibration were of exactly the correct amount to insure that, in conjunction with the finite velocity of light, it was impossible to observe effects produced by our velocity through space (the Aether).

- **Redefinition:- Since the Lorentz Transformation, $(1-V^2/C^2)^{0.5}$, appears many times in the material which follows follows, the symbol 'B_V' will be substituted. Thus: $B_V=(1-V^2/C^2)^{0.5}$.**

2.4- Since everything we experience, including the physiological sensations and behavior of our bodies, is the result of a measurement of some type, our absolute velocity with respect to space could never be observed. No matter what one's absolute velocity was, he could always assume himself to be at rest with respect to space and that everything that was not at rest with respect to him was moving through the Aether. With the effects on observations imposed by the Aether Relativity Theory, measurement of an observer's velocity with respect to the Aether was prevented by the fact that the finite velocity of light made it impossible to determine when two physically separated events were simultaneous. When the inability of an observer to communicate faster than the velocity of light is considered, it is simple but tedious to show, using elementary algebra, that the Aether Relativity Theory insures a null result of any attempt to determine an absolute velocity (velocity with respect to the Aether). An observer is therefore free to consider that any velocity reference frame between the limits of +/-C is valid as a base reference frame for making physical observations.

2.5- At the time, three difficulties seemed to remain with the Aether Relativity Theory. The first objection was that it did not account for the effects of velocity on electromagnetic phenomena. This objection was not a legitimate one. The three Lorentz Transformations allow the derivation of equivalent Lorentz Transformations for all physical parameters, including those of electromagnetics, by applying Dimensional Analysis to known physical equations. When these derived transformations are applied to electromagnetic phenomena, the Aether Relativity Theory is found to be valid for electromagnetic phenomena as well. The second objection was the question as to why, if the classical Aether is the absolute zero velocity reference for space itself, should Nature conspire to conceal our velocity with respect to it. That may have been a reasonable question at the time, but in the interim, quantum physicists have concluded that the forces between particles, such as between the atoms in a measuring stick, are electromagnetic in nature and are alleged to result from the exchange of virtual photons. A corollary to that conclusion is that since electromagnetic effects travel at the velocity of light, matter must adjust its parameters so that the velocity of light appears unchanged to a local observer. (It is fortunate that these adjustments occur. If they did not, travel at high velocity, such as the velocity of the Earth in its orbit or the velocity of the Sun in its galactic orbit, could be extremely hazardous to one's health.) The final objection to the Aether Relativity Theory is that if the Aether is a solid medium, as required for the propagation of the light as a transverse wave, matter should not be able to travel through it without resistance. A means by which Nature may have resolved that objection is provided later.

2.6- In 1905 Dr. Einstein, apparently sensing an opportunity in the alleged failure of the Aether Relativity Theory to correctly predict the electromagnetic effects associated with velocity, published the Special Theory of Relativity. This theory was based upon Poincare's Principle of Relativity and asserted that any velocity between the limits of +/-C could be considered to be valid for use as a zero velocity reference for the purpose of physical observations. The Special Theory of Relativity provided the same transformations for mass, length, and time as did the Aether Relativity Theory published two years earlier. Under both approaches, any inconsistencies resulting from the effects of velocity on observations were concealed by the effects of the Lorentz Transformations and the fact that the finite velocity of light made the absolute synchronization of physically separated

clocks impossible. As with the Special Theory of Relativity, the Aether Relativity Theory allowed one, regardless of his velocity through space, to be free to consider himself at rest and apply the Lorentz Transformations to observations made in systems which were moving with respect to himself. It must be pointed out that Special Relativity did not have the difficulties with respect to electromagnetic phenomena alleged to be a weakness of the Aether Relativity Theory for the simple reason that, instead of resolving those difficulties, it arbitrarily defined them as non-existent.

2.7- When one compares the Aether Relativity Theory and Special Relativity objectively, one finds that they are identical theories and differ only in philosophical interpretation. Under the Aether Relativity Theory, space is filled with a medium called the Aether which acts as the framework for the Universe and our velocity through that Aether is concealed by the effects described above. Under Special Relativity, the absolute velocity reference represented by the Aether is omitted since it does not appear in the mathematics. Both theories conclude that the effects of velocity on measuring instruments (including the physiological sensors of our bodies) and the finite velocity of light make it appear to any observer that he is at rest and that everything having a velocity relative to him is in motion. It should be obvious to all that the Aether Relativity Theory is a special case solution of the Special Theory of Relativity in which one of the infinite number of zero velocity references frames considered to be valid under Special Relativity is the correct one even though one cannot determine his velocity with respect to it. Special Relativity takes the position that, since our velocity with respect to an absolute spatial reference cannot be determined by observation, it is meaningless to consider the existence of an absolute velocity reference as part of physical theory. As we shall see, not only can our absolute spatial velocity be measured, asserting that it can't violates a basic rule. One should be extremely careful in declaring something to be impossible. Invariably as soon as such a declaration is made, some damned fool will come along and do it.

2.8- Recognition that our absolute velocity through space cannot be measured is a far cry from a proof that an absolute velocity does not exist. If it were proven that the absolute velocity reference represented by the Aether was not valid, then it would be proven that one of the velocities that Special Relativity allows to be considered as at rest can not be used as a basis for physical experiments. Such a proof would also be a proof that Special Relativity was invalid. Apparently, Dr. Einstein thought the interpretations associated with the Aether Relativity Theory to be correct since it has been reported that he maintained a belief in absolute simultaneity between physically separated events (a belief which requires the existence of the Aether) for 25 years after the publication of Special Relativity. He also is reported to have warned that "we have not proven that the Aether doesn't exist, we have only proven that we do not need it [for computations]".

2.9- Since the Aether Relativity Theory preceded the Special Theory of Relativity by two years and was in actuality the same theory in a different form, it was necessary to make a determination between them. That became a matter of belief rather than proof and, as the multitudinous deaths in religious wars over the centuries have amply demonstrated, the more unprovable a belief is, the more savagely men will fight to defend it. Such a savagery occurred in the discussions which followed. The Aether Relativity Theory was advocated by a cadre of physical scientists whose primary reliance was on their physical insights and who used their mathematical skills to quantify the results of those insights. Special Relativity was advocated by a different cadre of physicists who had mastered mathematics well but who had found that their use of physical insights, which, like art, requires an innate aptitude in addition to training, were unreliable. Since talent is scarce in any field, the advocates of Special Relativity won the battle. The proponents of the Aether Relativity Theory were ridiculed by having the Aether compared to the Emperor's Clothes in the fable of the same name. The general public was led to believe that the mystery resulting from the null results of the Michelson-Morley Experiment was resolved by Dr. Einstein even though Fitzgerald, Larmor and Lorentz had achieved that result two years earlier.

2.10- The author is seriously troubled by the historical accounts. The fact that the knowledge and insight to resolve the dilemma represented by the Michelson-Morley Experiment had already been provided by truly intelligent men (Thompson, Lorentz, Larmor, and especially Fitzgerald), degrades

Dr. Einstein's contribution in this area from a work of brilliance to the rather trivial exercise of formulating the existing knowledge into mathematical terms for easier use in computational activities. [Dr. Einstein's famous equation, $(dS)^2=(dX)^2+(dY)^2+(dZ)^2-C*(dT)^2$, which is accepted as the most succinct means of defining the effects of velocity, follows from the fact that the Lorentz Transformations for length and time are identical to the Pythagorean Theorem.] However, the politics of the scientific community was not served by crediting Fitzgerald with the conceptual breakthrough since his approach did not suit its goals. As a result, Dr. Einstein was given that honor and was eventually proclaimed a deity of the new religion while the true contributors were relegated to footnotes in textbooks.

2.11- The strength of the feelings involved were brought home to the writer by personal experience. In the late 1950's, assuming that Special Relativity had been proven to validly represent our reality, the author began a good faith study of the subject for his own satisfaction. It was rather upsetting to learn the information provided in the previous paragraphs. Digging deeper, the author borrowed a technique from mathematics to show that the Aether Relativity interpretation must be correct because assuming the non-existence of the Aether led to an absurdity. In due course, this material was shown to a physicist whose specialty was Special Relativity. The man's reaction was astonishing. He did not take the intellectually reasonable although undiplomatic step of telling the author that he was an ignorant fool, instead he went into a rage and accused the author of being "dangerous heretic who must be suppressed". (It is fortunate for the author that this isn't the 16th century.) His violent emotional reaction was akin to that of the Muslim Ayatollah who allegedly condemned the author of the "Satanic Verses" to death. The reaction could only have come from an individual whose quasi-religious beliefs were threatened. They were not the reactions of a man who accepted Dr. Einstein's dictum that the search for truth must take precedence over the teachings of established authority regardless of the prestige of that authority.

2.12- In 1915, Dr. Einstein published his General Theory of Relativity. In deriving this theory he combined a new and apparently original concept, the Principle of Equivalence, with the Principle of Relativity upon which Special Relativity was based. Simply stated, the Principle of Equivalence asserts that gravitational acceleration can be considered to be equivalent to inertial acceleration. Unfortunately, Dr. Einstein failed to recognize that Tensor Calculus cannot be used to derive a relativistic theory (as discussed later) and employed that mathematical technique in the theory's derivation. Its use for such a purpose introduced a mathematical error of a type which, if persistently made by a student of Elementary Calculus, would result in a failing grade for the course. As a result of this error, the derivation of General Relativity was impossible in terms of our observable three dimensional Euclidian Space.

2.13- Instead of recognizing and correcting the source of his difficulty, Dr. Einstein took the easy way out and arbitrarily added an extra degree of freedom by asserting that space was curved by the presence of mass and was properly described by the non-Euclidian geometry of Riemann. Objectively, his approach might be compared to that of a mechanic who installs the wrong part in a machine by hammering it into place instead of obtaining the correct part. Discussions of General Relativity at the time justified its validity by two rather questionable and irresponsible arguments. The first argument was that there was no reason not to accept the idea that space was curved "since no one could prove that it wasn't" (a proof that space is flat will be described later). The second argument was that, while General Relativity taught that the gravitational field created energy from nothingness, the Law of Conservation of Energy was not violated since the energy which was created could not escape from the field. It would seem, from this reasoning, that the Law of Conservation of Energy obeyed the Eleventh Commandment, "Thou Shalt Not Get Caught". (Newtonian Gravitational Theory also asserts that the gravitational field creates energy and allows that energy to escape from the field. That theory must be forgiven for this deficiency because, in the 16th century, it had not been recognized that energy must be conserved.)

2.14- As a result of the defect in its method of derivation, the relativistic corrections to the classical Newtonian Gravitational Theory provided by General Relativity were not rigorously correct but were

only approximations. At the field strength existing at the surface of the Sun, these corrections revised the predictions of Newtonian Gravitational Theory by one part in a million. Due to the weakness of the Sun's field, General Relativity was able to predict, to within the limits of experimental accuracy, the anomalous precession of Mercury's orbit, the bending of the path of a ray of light as it passed close to the Sun and the slowing of time at the surface of the Sun evidenced by the red shift of its spectral lines. The effects caused by residual errors in General Relativity resulting from its invalid method of derivation are about a million times too small to be observed within the Solar System.

2.15- It has been asserted that observations made of the red shift of the spectral lines in the light from extremely dense and/or extremely massive stars and the observed change in the orbital period of massive binary stars due to gravitational radiation provide the necessary verification for General Relativity in strong fields. However, in order for such observations to provide that verification, they must be combined with orbital observations made by an on-site observer. Until mankind has the equivalent of Star Trek's Warp Drive, observational validation of General Relativity in strong gravitational fields would seem to be impossible. At present, all that the spectral shift of light from massive stellar objects proves is that gravity is a relativistic phenomena. It does not prove that General Relativity is the correct description of that phenomena. As pointed out earlier, Dr. Einstein was apparently aware of limitations in his derivation of General Relativity since it has been reported that he was uneasy about the extension of the theory to extremely strong fields.

Chapter 3 - The Nature of The Einstein Hoax

3.1- Since the Special Theory of Relativity and the Aether Relativity Theory which predated it are actuality the same theory and may be derived one from the other, the question arises as to the nature of Dr. Einstein's contribution to the solution of problems related to velocity. In a historical text published in the 1920's it was stated that his principle contribution was the demonstration that mathematics could be used to derive physical theory and, since mathematics could be taught to anyone, Science did not need to await the contributions of the "few great minds that arise in each century" (a category which most certainly includes Fitzgerald) to achieve progress.

3.2- The insidious end result of that philosophy was verified by a telephone call received by the author from a physicist at a highly respected Ivy League University whose status was sufficient to have had his work described in Time Magazine. The author was advised that the physicist's sole job was to search for mathematical relationships which provided predictions and to devise and perform experiments which determined whether those predictions agreed with observation. It was not considered to be the physicist's job to provide an understanding of the mechanisms by which Nature achieved its results. That task was the proper province of philosophers and meta-physicists and was beneath the dignity of physicists. This viewpoint is reinforced by one of the most respected theoretical relativistic physicists in the world in a statement in one of the most prestigious scientific publications in the world. He stated that he was unconcerned as to whether a theory correspond to reality because he didn't know what reality was, he only was concerned that a theory correctly predict experimental results. To place that high sounding philosophy in perspective, both a highly talented musician and a trained circus seal can play "Yankee Doodle" on a set of tuned bicycle horns and receive the applause of an audience. While the musician would probably want money and the seal would be content with a fish, the real difference is that the musician would understand the meaning of the music while the trained seal would have learned to play the tune through repetitive actions induced by a trainer. Unlike their counterparts of a century ago, it would seem that today many mainstream physicists do not feel the need to understand the phenomena upon which they are working but are content to do their work by manipulating mathematics and experiment using procedures they have learned only by rote. It is left to the reader to draw his own conclusions as to whether such an analogy is fair.

3.3- The publication of Special Relativity provided a golden opportunity for the majority of the academic community. Under the interpretations of Nature provided by Special Relativity the door was opened for the majority of its members who were without the talent required to understand its workings. At the same time, those with the necessary talent needed to understand reality instinctively recognized that contradictions were implicit in Special Relativity (described later) and could not accept the subject as it was presented. (Teachers of Special Relativity report that a significant percentage of intelligent and mathematically skilled students cannot master the subject.) The inability to accept Special Relativity, as presented, effectively eliminates individuals with a strong sense of reality (which by another name is called common sense) from the ranks of those who acted as advisors to PhD candidates and from the roles of those who perform the peer reviews which determine what is published in scientific journals. As a result, a selection process was gradually put in place which insured that only material which did not threaten the validity of Special and General Relativity was published. Material which appeared to be a threat, no matter how powerfully presented and how intellectually and observationally valid, was effectively squelched. On the other hand, material which supported Special and General Relativity, no matter how trivial or absurd, was readily published. Once this point was reached, it was possible to make the claim that the subject matter could not be understood in terms of common sense. It could only be understood in terms of mathematics and there were a limited number of minds in the world who could truly comprehend Dr. Einstein's work.

3.4- Early civilizations were based upon the invention of agriculture and the ability to determine the proper time for planting and harvesting crops was very important. In those societies, a small group of men studied the heavens and learned how to divine the seasons from the positions of the Sun, Moon, Planets, and Stars. Instead of passing along their knowledge, they kept it to themselves and became priests who provided life and death information for society as a whole. As a result of their monopoly of vital knowledge, more and more power and wealth flowed to them and in time they formed a religion. That religion eventually became the basis of all powerful states ruled by god-kings. In such a society, heresy was the most heinous crime imaginable, with revelation of the secrets of the religion to the masses a close second. From the vantage point of history, the motivation of these priests was obvious. They worked to achieve enormous power and luxury for themselves at the expense of the peasants. They did not work for the benefit of society as a whole.

3.5- The establishment of the relativistic effects as a mystery which could not be understood in terms of common sense placed the community of physicists into a position similar to that of those ancient priests. They possessed knowledge which could only be understood by those individuals who possessed the appropriate 'yup' in the form of a PhD in Physics. Naturally, no one whose innate sense of reality caused him to question the conclusions of Relativity ever received such a degree. (When the writer was interviewed for his first job, he was asked what kind of 'yup' he had. Puzzled, he asked for an explanation and was told that, when you spent the money it costs to go to college, you were not buying knowledge, you were buying a 'yup'. That 'yup' is required so that when you seek a job and the interviewer asks if you went to college, you can answer 'yup'. Of course, 'yup's from different schools are rated differently, but the prime purpose of schooling is to achieve that all important 'yup', it is not the acquisition of knowledge.)

3.6- The Einstein Hoax consists of maintaining the quasi-religious belief that the phenomena associated with velocity and gravitation cannot be understood by ordinary men using their common sense. It can only be understood in terms of mathematics performed by initiates who possessed the prerequisite 'yup's. Whether it is recognized or not, all of the essentials of a religion are present. There is a deity in the form of Dr. Einstein, who, like most of the men who have had that role thrust on them over the centuries, probably did not seek or even relish it. It has an established but unproven set of truths which were revealed by that deity. Finally, it is protected by selected defenders of the faith who, in this case, act through the peer review process to insure that heresy in any form is never published. The motive for the maintaining of the Einstein Hoax is rather obvious, it's money. Society expends a large sums supporting this priesthood through tuitions paid by

parents and grants by governments and industry. The donors believe they are paying for the teaching of the young, however, that teaching is mostly done by graduate students who are seeking their own 'yup's. The established possessors of the necessary 'yup's spend most of their time in research because, not only is that activity more interesting, it serves to advance their tenure protected careers. Should Special and/or General Relativity be shown to be fundamentally flawed, the careers of Relativists, most Cosmologists, and those working on Quantum Gravity and/or Unified Field Theory will have been wasted.

3.7- In the material which follows, the author will attempt to provide and justify the heresy required to remake Relativity Theory into a subject which both can be understood at the undergraduate level in terms of common sense and which will eliminate glaring defects in our current understanding of the fundamental principles of Nature and of Cosmology.

Chapter 4 - Does The Aether Exist?

4.1- Since the conclusion that the Aether does not exist is based upon unproven assertions on the part of key members of the community of physical scientists rather than upon evidence which would be admissible in a court of law, the subject must be examined with extreme care to guard against the possibility that evidence which would support its existence has not been knowingly or unknowingly suppressed. Remember, there are strong political reasons which act to bias the judgment of the academic community against the concept of the Aether. Determining whether the Aether exists requires asking questions which are readily answered by one interpretation, and which seem unanswerable by the other. Such questions encounter strong resistance when asked. In addition to those questions, experiments performed by quantum physicists have demonstrated the feasibility both of measuring the absolute velocity of an experimental setup through space and of communicating at velocities greater than the velocity of light. Achieving these results requires only minor modifications to their experimental arrangements.

4.2- How Does Light "Know" How Fast to Travel?:- This question arises from the fact that the velocity of light is independent of the velocity of its source. Under the interpretation of reality provided by Special Relativity, light is considered to consist of particles called photons which travel ballistically through empty space. Under the interpretation provided by the Aether Relativity Theory, light consists of packets(photons) of electromagnetic vibration transmitted through a medium called the Aether. Since one would expect the velocity of ballistic particles to be affected by the velocity of their source, Special Relativity would seem to be incapable of dealing with this question. The Aether Relativity Theory, on the other hand, has no difficulty. The velocity of propagation of a vibration in a medium is determined by the properties of the medium and is independent of the velocity of its source.

4.3- Consider a car traveling down a road towards a target (Figure 4.1). On board the car is a man with a rifle. At the side of the road is another man with an identical rifle. At the instant that the man in the car passes the man at the side of the road, they both fire at the target. As expected, the velocity of the bullet fired from the car is increased by the car's velocity and it reaches the target before the bullet fired from the side of the road. The sounds of the shots travel together at the velocity of sound in air and reach the target at the same time. The bullets are material particles projected to the target and travel at different velocities. The sounds of the shots are vibrations traveling through a medium and travel at the same velocity. Consider next an analogous experiment (physically realizable) in which a rocket is passing Mars on its way to Earth. At the instant that the rocket passes Mars, a radio on the rocket and a radio on Mars send a signal to the Earth. Along the whole path traveled by those signals, they remain side by side and they arrive at the Earth simultaneously. They travel together despite the fact that they were transmitted from sources having a velocity difference which could not be compensated at the transmitters since each

transmitter was ignorant of the velocity of the other. Just as the simultaneous arrival of the bullets at the target in the preceding example would cause a reasonable man to suspect some form of chicanery, would not the same suspicions be aroused by the assertion of Special Relativity that photons travel ballistically through empty space at a velocity which is independent of the velocity of their source. It is difficult to envision a means by which the independence of their velocities from the velocities of their sources could occur unless photons were wavelike disturbances propagating through a medium. To date no explanations, other than the reliance on some form of magic, have been provided by the proponents of Special Relativity. Instead, they have shouted down the question whenever it was raised.

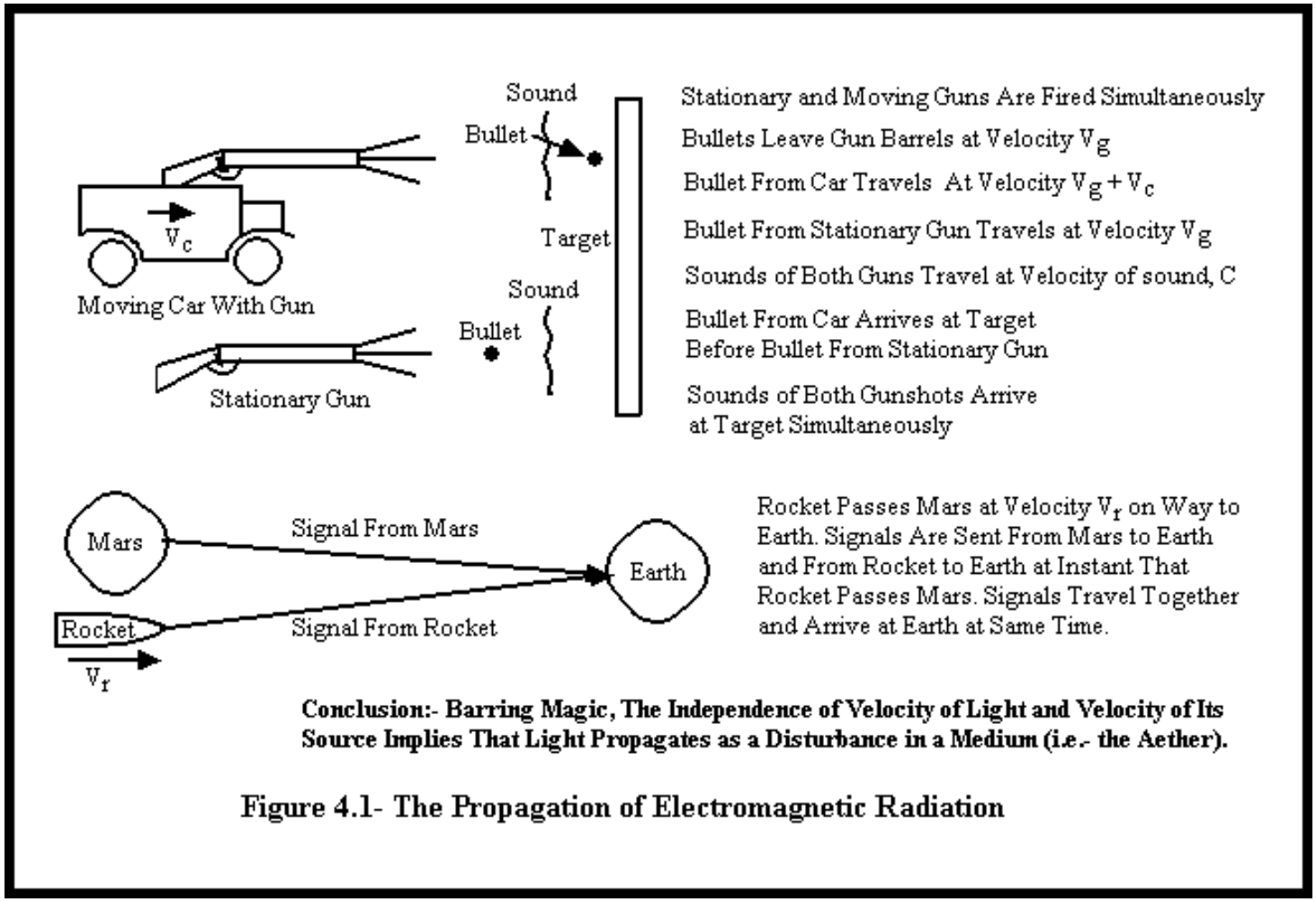


Figure 4.1- The Propagation of Electromagnetic Radiation

4.4- Why Does Light Travel at the Velocity of C?:- Current orthodoxy asserts that the Aether is not required to explain the propagation of light at its velocity of C. All that is required is the magnetic permeability, u', and the dielectric constant, e', of space. The velocity of light is then determined by the expression $C=(u'*e')^{0.5}$. As an analogy, if one strikes the end of a steel rod with a hammer, the sound of the blow propagates along the rod at a velocity, V, determined by the elasticity, e, and the density, d, of the rod in accordance with the expression $V=1/(e*d)^{0.5}$. If one accepts the above explanation for the velocity of light, consistency would require that he be willing to accept the conclusion that, since the propagation of sound at its velocity of V requires only the elasticity and density of the rod, the rod itself may be removed and only its elasticity and density retained to explain the propagation of the sound of the blow at the velocity V. While such a conclusion is obviously silly with respect to the rod, somehow it does not seem silly to Relativists when it is applied to Special Relativity's interpretation of the propagation of light.

4.5- How Does the Speed of a Clock After a Change in Velocity Compare with its Speed Before the Velocity Change?:- Consider, if your will, the following physically realizable experiment performed in compliance with the mathematical predictions of Special Relativity Theory and/or the Aether

Relativity Theory. There are two locations, perhaps the Earth (reference frame A) and Mars (reference frame B) as shown in Figure 4.2 , which are traveling at a significant velocity, V, with respect to each other. Observers at each location measure the velocity of the other location using Doppler radar as +V and -V respectively. There are identical clocks at each location which have been synchronized by radio signal. Because of the finite velocity of light, the relative velocity between the observers causes each of them to observe that the clock at the other location is running more slowly than his clock. A rocket ship is at rest on the Earth and contains an observer and a third identical clock. Both the observer on the Earth and the observer in the rocket ship find that their clocks are running at the same speed and that the clock on Mars is running more slowly. The observer on Mars observes that both the clock on the Earth and the clock in the rocket are running more slowly than his. The rocket then takes off and lands on Mars. The observers on the Earth, on Mars, and on the rocket measure that the velocity of the rocket has changed by +V. The observer on the Earth measures that the clock on the rocket has slowed and it now runs at the same speed as the clock on Mars. The observer on Mars measures that the clock on the rocket has sped up and now runs at the same speed as his clock. The observer on the rocket observes no change of the speed of his clock, but, observing that his velocity has changed by V, concludes that its speed actually did change as a result of his change in velocity and concludes that the change was concealed from him by the effects of the Lorentz Transformation for Time.

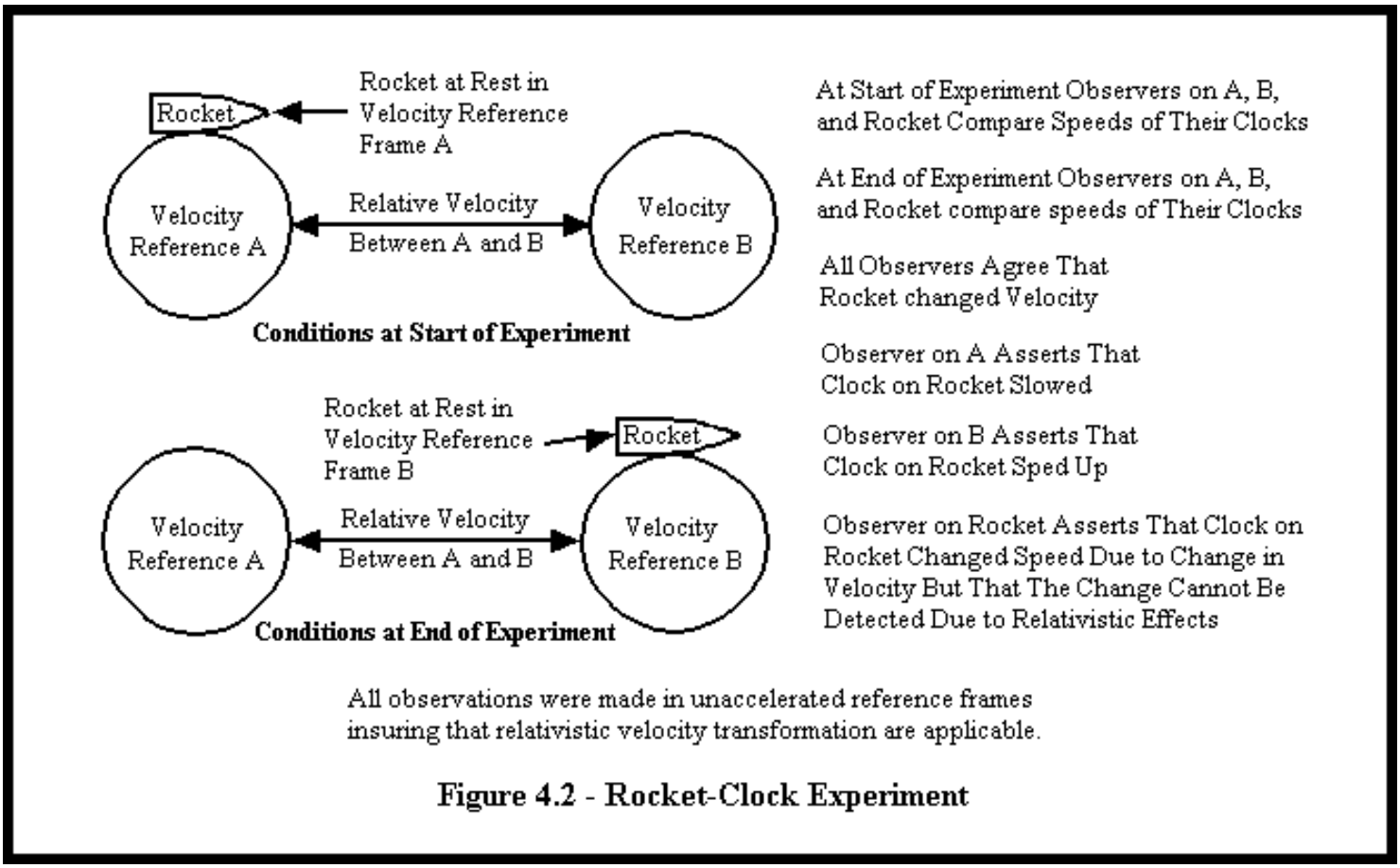


Figure 4.2 - Rocket-Clock Experiment

4.6- With respect to the speed of the clock, the observer on the Earth asserts that the speed of the clock on the rocket slowed, the observer on Mars asserts that the speed of the clock on the rocket increased, and the observer on the rocket agrees that the speed of his clock has changed but recognizes that the change is concealed from him by relativistic effects. There is one test result upon which all three observers agree and which therefore must be accepted as observationally verified. The change in velocity of the rocket produced a change in the speed of its clock. Under the interpretations of the Aether Relativity Theory there is no conceptual difficulty. The change in the velocity of the rocket caused the speed of its clock to change uniquely, but the nature of that change is concealed from observation. The concepts of Special Relativity, however, produce an

absurdity. One event, the change in the velocity of the rocket, has produced two different and mutually exclusive results. The change in velocity of the rocket has caused its clock to both slow down and to speed up, depending upon whether the Earth or Mars is considered to be stationary. Since there was a single event, the change in the velocity of the rocket, only a single result can have occurred. At this point, readers who have been trained in Special Relativity will object. They will state that the change in velocity of the rocket involves acceleration and the Special Theory of Relativity was not derived for accelerated systems. Such an objection is irrelevant. All observations were made under conditions of zero acceleration and the Special Theory of Relativity is clearly applicable. A famous author has been quoted to the effect that the true measure of intelligence is the ability to hold two mutually exclusive ideas at the same time. *False!* The holding of two mutually exclusive ideas at the same time is evidence of a mind that is too lazy and/or incapable of resolving the inconsistency by correcting one or both of the ideas and who is too arrogant to admit the need for the correction and/or his inability to make it.

4.7- Enter the Tachyon:- In the 1960's it was recognized that the Lorentz Transformations did not prohibit velocities greater than the velocity of light. Instead they demonstrated that the velocity of light represented a velocity which material particles or objects could approach but not achieve because, at that velocity, the Lorentz Transformation became zero. At the velocity of light, kinetic energy (or mass if you prefer) became infinite and the rate of passage of time became zero. At velocities greater than the velocity of light, the infinities and zeros do not occur and it is theoretically possible for matter to travel at those velocities. Hypothetical particles which traveled at velocities greater than the velocity of light were postulated and given the name tachyons. For velocities greater than the velocity of light, the quantity within the square root sign in the Lorentz Transformation becomes negative and the Lorentz Transformation may be rewritten. It then becomes $i*(V^2/C^2-1)^{0.5}$, where *i* is equal to $(-1)^{0.5}$.

4.8- At this point, readers might question whether *i* has any physical meaning since $(-1)^{0.5}$ can exist only in one's imagination. Indeed, this was the viewpoint for several centuries until it was realized that the presence of *i* in a physical equation could be considered to represent a rotation of an effect into an axis which was perpendicular to the axis of the original coordinate system and was therefore unobservable. This concept has been found to be quite useful in the physical sciences and particularly in Electrical and Electronic Engineering since it allows phenomena which occur in two perpendicular axes to be represented in terms of the algebra normally used for a single axis problem. To observers confined to making their observations in the real axis, effects occurring in the imaginary axes are not directly observable and can only be inferred. Since *i* represents a rotation through 90 degrees from the real axis to the imaginary axis, as one might expect, equations containing i^2 represents a rotation of 180 degrees from the positive real axis to the negative real axis and produce observable effects which are reversed in sign.

4.9- While most of the properties of the hypothetical tachyon occur along the unobservable imaginary axis, it has at least one property whose Lorentz Transformation involves i^2 and therefore occurs in the real axis where observation is possible. That property is its velocity. (Since velocity is length divided by time, both of which are subject to Lorentz Transformations, the Lorentz Transformation for a tachyon's velocity contains i^2.) It is not surprising that the tachyon has never been observed as a particle, since in addition to the fact that many particles have been predicted long before they were observed, it would not be recognized as a particle because some of its key properties would be unobservable. It is possible, however, to draw a conclusion as to the at rest velocity of a tachyon. The at rest velocity of a particle traveling below the velocity of light is the velocity at which the magnitude of its Lorentz Transformation B_V is a maximum (V equals zero). By analogy, the at rest velocity of the tachyon would be the velocity at which the magnitude of its Lorentz Transformation is also at its maximum. Since this occurs when V is infinite, the at rest velocity of the tachyon should also be infinite. Experiments by quantum physicists have shown that mysterious effects called quantum numbers propagate at a velocities which are significantly faster than the velocity of light, possibly at an infinite velocity. Quantum numbers would seem to have

something in common with the hypothetical tachyon.

4.10- The very concept of the tachyon is devastating to the idea that Special Relativity is a valid representation of reality and it was vital to those who had built their careers around the Special Theory of Relativity that the idea of tachyons be discredited if the Aether Relativity Theory were to continue to be suppressed. To see why this should be so, consider the logic contained in the following statements:

- **A:- If I had a microscope, I would observe the existence of germs.**
- **B:- The existence of germs does not depend upon the existence of the microscope.**

The first statement asserts that, except for the case where microscopes cause germs, germs exist regardless of whether they have been observed. The second statement removes the escape clause from the first statement and it becomes equivalent to "germs exist". Now consider the following analogous statements:

- **C:- If I could communicate using tachyons, I would be able to establish absolute simultaneity between physically separated locations, measure my velocity with respect to space itself, and thereby verify the Aether Relativity Theory.**
- **D:- The validity of the Aether Relativity Theory does not depend upon my ability to communicate using tachyons.**

A little reflection should convince the reader that, if statement D is true, the mere fact that I can conceive of communicating through the use of tachyons demonstrates that the limitation imposed on the Special Theory of Relativity by Aether Relativity Theory represents reality. *The classical Aether must exist!*

4.11- Since it was vital that the idea of tachyons be suppressed and the fact that they had not been observed is not sufficient to accomplish that suppression, another approach was required. It was asserted that communication by tachyons would violate causality. (Causality is a very reasonable concept which asserts that a result cannot occur prior to its cause.) As an example, consider sending a signal by tachyon from the Earth to the Moon. If the time of transmission of the signal was 11:00:00 AM and the tachyon arrived at the Moon at 10:59:59 AM, it would seem to imply that it arrived at the Moon one second before it was transmitted. Literally interpreted, such a result would be a clear violation of causality. The argument falls apart when it is remembered that the clock on the Moon was synchronized with the clock on the Earth by an electromagnetic signal. If the Earth-Moon system were traveling through the Aether in a direction towards the Moon at a velocity of 0.81 times the velocity of light, the clock on the Moon would have a synchronization error causing it to be one second late with respect to the clock on the Earth. The apparent violation of causality would then be explained as being caused by the Earth-Moon system's velocity through the Aether. There are only two ways in which communication by tachyon can produce a violation of the Principle of Causality. The first possibility occurs if the tachyon arrives early by an amount of time greater than the observed time for light to make the trip. The second possibility is if tachyons were sent on a round trip from the Earth to the Moon and back and arrived on Earth before they were sent. While there is a school of thought which suggest that this can happen, it is based upon a misapplication of the Special Theory of Relativity.

4.12- <u>The "Fictitious" Forces of Acceleration</u>:- Newton's Second Law of Motion states that for every action there is an equal an opposite reaction. An exception to this rule seems to be the forces associated with inertial and gravitational accelerations. A force must be applied to an object to change its velocity, but there is no apparent opposing force to match the applied force. The same situation occurs when one considers the force of gravity. As you sit in your chair you are conscious of a force pressing you against it, but, as with inertial acceleration, there is no apparent opposing

force matching it. As a result, the opposing forces required by Newtons's Second Law of Motion for both inertial and gravitational forces are referred to as fictitious. It is sometimes asserted that the General Theory of Relativity has shown that what appears to be the force of gravity does not occur but is a manifestation of the curvature of space associated with the source of the gravitational field. As we shall see later, General Relativity does not eliminate gravity as a force, it replaces it with the observable component of an enormous force acting along an unobservable fourth spatial axis. If one accepts the existence of the classical Aether, the fictitious forces present no conceptual difficulty since they are acting against the rigid medium of the Aether. Under Special Relativity, on the other hand, there is no medium for these forces to react against, and one is forced to accept the existence of exceptions to Newtons's Second Law of Motion.

4.13- Action at a Distance:- One of the reasons the concept of the Aether was accepted in the 19th Century was the need to explain the ability of forces to act between particles or objects which were separated in space. With the acceptance of Special Relativity, the Aether was banished from physical theories and another means of explaining the ability of these forces to act was required. The result was the introduction of the concept of virtual particles which bounced back and forth to produce the observed forces in a manner analogous to the production of force between two athletes throwing a medicine ball to each other. That concept has a difficulty. The mutual exchange of a medicine ball can only produce a repulsive force between the athletes. In order to produce an attractive force, the mass of the medicine ball would need to be negative. To date no theoretician seems to have raised the possibility that such is the case for the postulated virtual particles and one must conclude that, to supply an attractive force, the virtual particle must be under tension and consequently the distance over which it can act is limited by its size. If the exchange of virtual particles produces forces which act at a distance, they would themselves constitute a medium equivalent to the Aether and the need for the Aether to explain action at a distance would not have been resolved, it would merely been pushed down one level into the virtual particle. Since the advocates of Special Relativity have not addressed questions such as these, Dr. Einstein's statement that the need for the Aether had been eliminated is not true, it only appears to be true because embarrassing questions have been swept under the rug.

4.14- The precept that electrostatic forces result from the exchange of virtual photons is readily tested. Such an experiment is diagramed in Figure 4.3. In this experiment, two metal plates are suspended parallel to each other in a large electromagnetically shielded and evacuated chamber. The plates are located symmetrically about the center of the chamber. Midway between the plates is a wire which is capacitively coupled to a suitable radio receiver. The plates are connected to high voltage D-C sources of equal amplitude and opposite polarity. The high voltages on the plates produces a strong electrostatic force of attraction between them which, since it acts over a distance, must either result from an electric stress in the Aether or, in accordance with the currently accepted concepts, from the exchange of virtual photons between the plates. (A magnetic equivalent of this experiment could be conducted with electromagnets substituted for the electrically charged plates.) The concept that the force results from an electric stress in the Aether is straightforward and needs no further explanation. The concept that the force results from the exchange of virtual photons is more complex and requires further examination.

4.15- If the force between the plates results from the exchange of virtual photons, then the relatively large spacing between the plates insures that the virtual photons have a fairly long wavelength and a frequency low enough to allow them to be sensed by a conventional television set. As a result of that low frequency, a large flux of virtual photons is required to produce the force level that a high voltage can produce between the plates. A large virtual photon flux will, in turn, induce a high level of random noise in the wire located between the plates and will cause a high noise output in the radio receiver. (The evacuation of the chamber insures that the noise was not generated by ionized gas molecules.) While this experiment is readily executed, it is not necessary for it to be performed. If electrostatic forces resulted from the exchange of virtual photons, the electric fields which abound at various locations, such as between the surface of the Earth and clouds or the voltage on the picture tube of a TV set, would generate sufficient noise as to render electromagnetic

communication impossible.

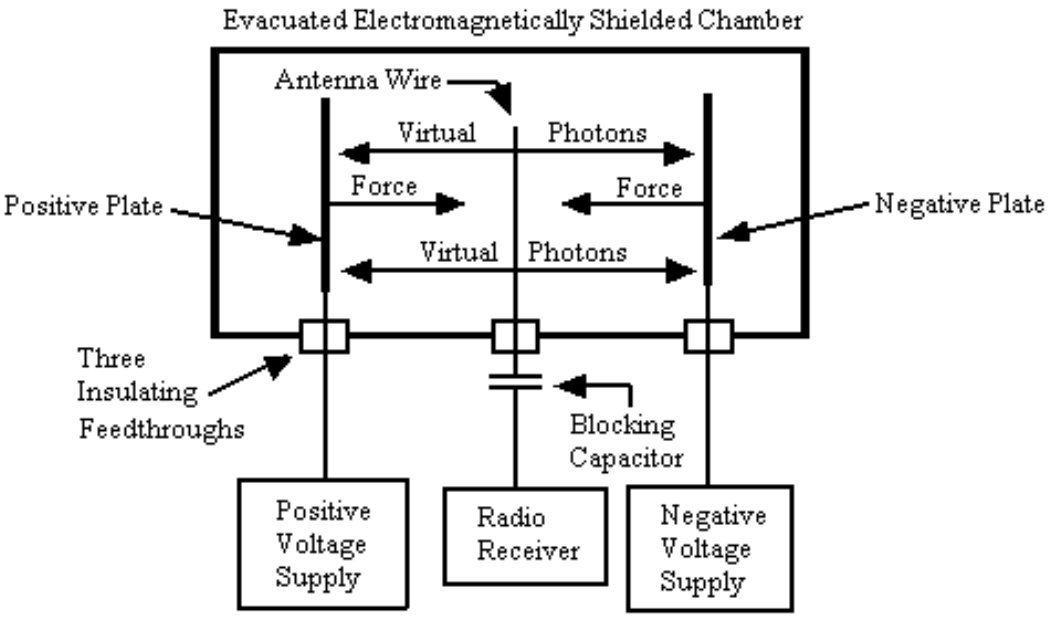


Figure 4.3 - Testing for Virtual Photons

4.16- Since we regularly use electromagnetic waves as a means of communication and that communication seems unaffected by the presence of static electrical fields, it is safe to conclude that electrostatic forces do not result from the exchange of virtual photons. The only explanation which seems to remain is that they result from a stress in the Aether. If both our experience already denies, and a physically realizable experiment will also deny, that virtual photons act as carriers of the electrostatic force, they are most certainly ruled out as carriers of the magnetic force. If we are forced to abandon the idea that virtual photons carry the electromagnetic forces, consistency requires that we abandon the idea that virtual particles named gluons carry forces within the nuclei of atoms. It is time to go back to the subatomic drawing board. A possible nature of those forces will be discussed later.

4.17- <u>The Radiometric Measurement of Our Velocity Through Space</u>:- In November 1977, a paper read at an American Astronomical Society convention in Atlanta announced that measurements of the intensity of the microwave background radiation of space in different directions showed that the Earth was moving through space at a speed of about 700,000 miles per hour. The experiments were conducted by radiometers installed in a U-2 aircraft flown at an altitude of 70,000 ft. with a methodology which was apparently beyond challenge. The report of these experiments led to consternation on the part of cosmologists because it did violence to their existing concepts concerning the distribution of matter in space. An even more significant result of these experiments was not recognized. The observance of this velocity drives experimental nails into the coffin of the Special Theory of Relativity because the validity of that theory, in comparison to the more restrictive Aether Relativity Theory, depends on the fact that it is impossible for an observer to measure his absolute velocity though space. As often happens, as soon as one declares that something is impossible, some damned fool comes along and does it. The experimenters just didn't play fair. Inadvertently, by measuring the velocity of the Earth through space, they demolished the underpinnings of the Special Theory of Relativity and established that the Aether Relativity Theory was the correct interpretation of reality. *(Up with Fitzgerald, down with Einstein.)*

4.18- <u>Dirac's "Sea" of Negative Energy</u>:- In the 1930's Dr. P. Dirac considered the effect of the impact of a high energy photon (e.g.- 10^6 electron volts) against a more massive particle. He concluded

theoretically that the impact would produce both an electron and a positron and had the satisfaction of having that prediction verified by observation. His theoretical treatment had one difficulty. It also concluded that all of the matter in the Universe would vanish in a small fraction of a microsecond. Since the Universe continues to exist, it was necessary to revise the theory. The resulting revision was to consider that all of space was solidly filled with negative energy (whatever that is). The production of the electron-positron pair was considered to result when the impact of the photon knocked an electron from that sea of negative energy and left a hole where the electron had been. That hole represented a missing negative charge in the sea of negative energy and appeared to us as a positive electron. One might reasonably wonder how Dirac's concept of a sea of negative energy which pervades all of space differs significantly from the concept of the classical Aether.

4.19- The Characteristics of the Aether:- The discussions to this point, and more particularly those which follow in successive chapters, imply that, in order for "reality" to have the properties which we observe, the Aether must have, as a minimum, the following properties:-

- **It must be a solid medium rather than a fluid. If it were not a solid medium, transverse electromagnetic disturbances (light) would not propagate since transverse disturbances cannot propagate through a fluid.**

- **It must have, as a minimum, a dielectric constant, a permeability, and occupy a volume since these properties are readily observed.**

- **It apparently is absolutely continuous rather than composed of minute particles. This continuity may well approach a zero size as a limit since it behaves as if it had a "Q" which approach infinity.**

    - **A tuning fork made of steel will ring for a prolonged period after being struck since steel is a high "Q" material. One made of lead will merely "thunk" when struck since lead is a low "Q" material. Disturbances in the Aether do not die out at a detectable rate while propagating through free space suggesting that the Aether has a "Q" which is enormous and may well be infinite.**

- **Material particles must be constructed in such a way that it is possible for them to propagate through the solid Aether (Chapter 13).**

4.20- Special Relativity and Occam's Razor:- It is sometimes asserted that Occam's Razor shows that the Special Theory of Relativity is to be preferred over the Lorentz Contraction-Aether Theory. Occam's Razor is a philosophical construct which asserts that, when there are two or more explanations of a phenomena, the most simple explanation should be chosen. In the case of these theories, Occam's Razor is ambiguous. Computations based upon Special Relativity are simpler than those strictly based upon the Lorentz Transformation-Aether Theory for the reason that it allows the observer's velocity reference frame to be used as the basis of computation rather than requiring the use of an infinite number of velocity reference frames that would seem to be required by the Lorentz Transformation-Aether Theory. The downside of the Special Theory of Relativity is that it requires the acceptance of the idea that an infinite number of velocity reference frames correctly represent reality.

4.21- The Lorentz Transformation-Aether Theory, on the other hand, asserts that there is only one absolute velocity reference frame, and it would superficially seem to require the use of separate calculations for each of the infinite number of possible velocities between the observers velocity reference frame and the absolute velocity reference frame. However, such a complication does not occur. As shown Figure 6.4 and the text which accompanies it, the absolute reference frame cancels from all calculations and observations and the mathematics of Special Relativity are completely applicable. (This happy effect results from the fact that the Lorentz Transformations are

multiplicatively commutative. - See Chapter 8.)

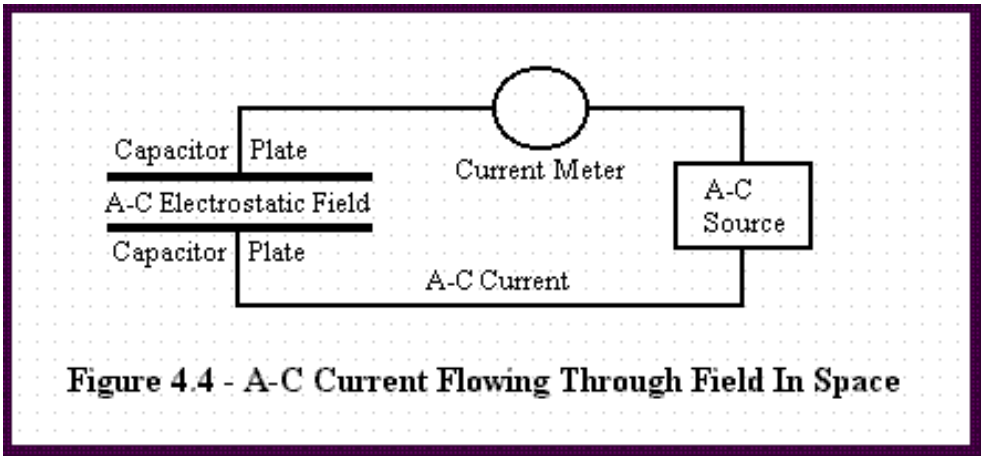


Figure 4.4 - A-C Current Flowing Through Field In Space

4.22- The Implications of Maxwell's Equations:- Based upon the discoveries of Faraday, Dr. Maxwell derived the famed equations which define the electromagnetic field. According to early texts, he did this by imagining "displacement currents occuring in space" even though he claimed not to have and understanding of what those currents could be and when Faraday requested an explanation of the theory in words, Maxwell is alleged to have been unable to provide it. If the author is to believe a recent communication, the current teaching is that Maxwell's Equations do not have a physical explanation, *they just are!*

4.23- Dr. Maxwell derived his equations based on the idea of "displacement currents" in space. To understand the reason for considering these "currents", consider what happens when an A-C voltage is applied across the plates of a capacitor consisting of two parallel plates in a vacuum as shown in Figure 4.4. In this figure, the applied A-C voltage (which may be assumed to be identical at the supply and the plates) causes an A-C current to flow in the wires to the plates which is phased 90 degrees in advance of the voltage. Since this is a series circuit, the current in all parts of the circuit must be instantaneously the same. That means that the current must flow through the space between the plates, but, since the conventional carrier of electric current (e.g.- electrons, ions, etc.) cannot pass between the plates, the current must flow between the plates without the mediation of charged particles. In addition, a magnetic field which surrounds the electric field is generated in proportional to its rate of change. Similarly, an electric field is generated in proportion to the rate of change of the magnetic field, again phase shifted 90 degrees in advanceof the mmagnetic field. In combination, these two phase shifts are 180 degrees, and are capable of sustaining an oscillation by feeding energy cyclically from one field to the other *without the intervention of any other mechanism*. Maxwell's Equations concisely describe the interaction and show that such an oscillation will propagate as a wave disturbance which is part of the electromagnetic spectrum.

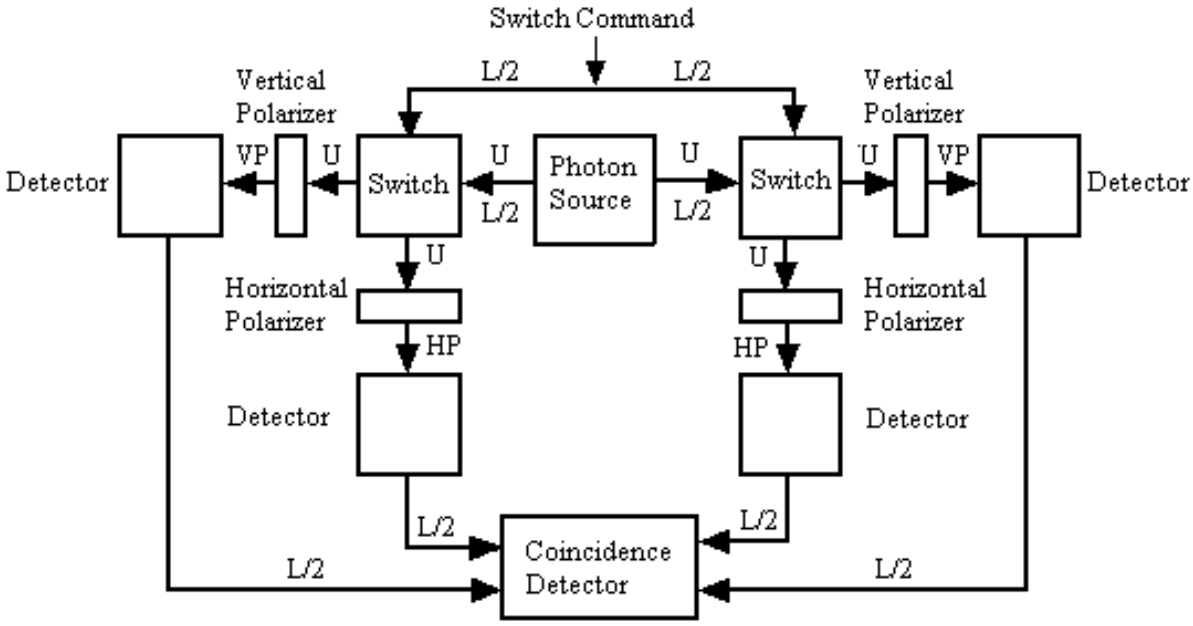
4.24- The difficulty in describing Maxwell's Equations in words does not derive from the equations themselves, the preceding paragraphs would seem to do that quite nicely. The difficulty arises when one tries to reconcile them with the "empty" space implied by Special Relativity. After all, how can electrical currents flow in empty space and how can magnetic forces exist in that space? On the other hand, if one considers that the space is filled with the classical Aether, the problem vanishes. One could consider that the Aether is stressed by the application of an electrical field. This stress reveals itself as a negative electrostatic potential at one plate and a positive electrostatic potential at the other plate and produces an attractive force between the surfaces applying the field (space has a dielectric constant). (One could also argue that the Aether contains two electrostatic components, positive and negative, in juxtaposition, and these components are pulled apart by the electric field) The rate at which the electric stress is applied produces a hoop stress in the Aether which stores energy and which we observe as the magnetic field (space has a magnetic permeability). The rate of change of the magnetic field similarly produces an electric field which acts on the electric components of the Aether. These two effects are not mirror images of

each other, we observe point electrostatic charges (electrons, positrons, etc.) but do not observe point magnetic charges (monopoles). As we shall see later on, both the Velocity and Gravitational Transformations for permeability and the dielectric constant differ significantly. (Viewing the Aether in this manner provides an explanation for an observed phenomena. If the Aether is sufficiently stressed by an electromagnetic field, the possibility suggests itself that the stress is relieved locally by a rupture which generates electon-positron pairs.)

Chapter 5 - The Resurrection of Absolute Velocity By Quantum Experiments

5.1- While the preceding chapter is probably adequate to convince individuals whose thought processes include common sense that the Aether Relativity Theory and not Special Relativity represents reality, it will not convince most members of the academic community. In order to acquire their PhDs, they have, of necessity, allowed themselves to be brainwashed into submerging common sense reasoning in favor of reasoning by formal procedures. In so doing, not only they have they unknowingly suppressed the most powerful capability of the brain, its pattern recognition capability, and concentrated on the development of one of the brain's lesser capabilities, its ability to process logic, they have made it possible to ignore aspects of the problem which are not included in the postulate structure of the mathematics. To convince those individuals, experimental evidence is required. Fortunately, that evidence has been supplied by experiments in Quantum Physics.

5.2- An article in one of the world's most prestigious scientific magazines in the late 1980's described experiments which demonstrated that the polarization of paired photons (generated by a common source) was coupled in such a way that changing the polarization of one photon changed the polarization of the other. More significantly, they demonstrated that the velocity of the polarization coupling between the paired photons was at least 4 times the velocity of light. These results raise the question as to whether polarization, which quantum physicists designate as the photon's quantum number, could be considered to be coupled by an observable property of the as yet to be observed tachyon. If so, one would expect that the coupling of the polarization of paired photons would propagate at an infinite velocity. Since the energy content of a photon does not change as a result of its direction of polarization, the Special Theory of Relativity and/or the Aether Relativity Theory do not impose a velocity limit on the transfer of information by the coupling of the plane of polarization between paired photons. It should be noted that Special Relativity would seem to require that such polarization coupling propagate at an infinite velocity. The reason that the velocity of communication is limited to the velocity of light is that the communication is invariably encoded in the form of energy and the Lorentz Transformation for energy is $1/(1-V^2/C^2)^{0.5}$ which becomes infinite at the velocity of light and imaginary above that velocity. The situation changes when we examine polarization angle. The angle of polarization of a photon is measured in radians, which is a length along an arc divided by the radius of the arc. As such, polarization angle is a length divided by a length and is therefore dimensionless. The Lorentz Transformation for angle is unity for all velocities between +/- infinity. It is easily shown that this conclusion holds true even at the velocity of light where the determination of the transformation involves multiplying zero times infinity. If polarization coupling between "paired photons" does occur, Special Relativity would assert that it must occur at an infinite velocity in accordance even as the more rational of the two interpretations of Quantum Theory asserts that it does. Although the authors of the article made no such claim, perhaps because they wished their work to be published, the experiments described in the article demonstrated both that our absolute velocity through space could be measured (validating the Aether Relativity Theory over the Special Theory of Relativity) and that communication at velocities greater than the velocity of light was feasible with minor modifications to the equipment.



U = Unpolarized HP = Horizontally Polarized VP = Vertically Plarized
L/2 is length of path. All paths so designated are equal.

Figure 5.1 - Block Diagram of Demonstration of Faster Than Light Polarization Coupling of Paired Photons

5.3- In the article it was stated that attempts to use the apparatus to communicate at velocities greater than the velocity of light resulted in the transmission of noise instead of information. Their failure to achieve communication resulted from the fact that, while they were obviously good quantum physicists, they were not good communication engineers. In analogous electronic terms, they were attempting to communicate by phase modulating a randomly phased carrier. In such an arrangement, the randomly phased carrier injects white noise that prevents the information, which is actually present in the received signal, from being decoded. The experiment did demonstrate that, if the carrier had been coherent, the desired propagation of information at translight velocity would have been achieved.

5.4- The experimental setup is diagramed in Figure 5.1. A photon source is provided which contains excited atoms of a type which emit a pair of photons of the same polarization in opposite directions whenever one of them reverts to its unexcited state. Each of the photons of a pair (left and right) are sent to an optical switch which sends its photons in one of two directions in response to a command signal. Depending upon the setting of the switch, each photon passes through a horizontally or vertically oriented polarizer and is received by one of two photon detectors. (Two photon detectors are at each end of the apparatus.) The outputs of the four detectors were compared in a coincidence detector. The purpose of the coincidence detector is twofold. It insures that the only detections which are recorded are those which occur as simultaneous pairs at opposite end of the apparatus and therefore result from photon pairs and not from spurious photons. It also allows the matching detections to be sorted into four categories, horizontal/horizontal, vertical/vertical, horizontal/vertical, and vertical/horizontal. The lengths of the right and left halves of the experimental setup are carefully matched to cancel the effects of the transit time of the photons, the propagation times of the drive signals to the switches, and the propagation times of the signals from the detectors to the coincidence detectors.

5.5- The resulting detections were quite revealing. An overwhelming preponderance of them consisted of horizontal/horizontal and vertical/vertical events, with a much smaller number of horizontal/vertical and vertical/horizontal events. Since the response time of the optical switches which changed the polarization of one of the photons was on the order of 10 nanoseconds and the time required for light to travel the length of the experimental setup was 40 nanoseconds, such a result could only have occurred if the polarization coupling between the paired photons propagated at a velocity which was significantly larger than 4 times the velocity of light. The accuracy of this determination is limited by the speed of the switches and by the length of the setup. While it is probably quite difficult to improve the switches, the length of the setup is, in principle, limited by the size of the Earth. It is not difficult to envision an experimental arrangement which would demonstrate a propagation velocity for polarization coupling between paired photons greater than a million times the velocity of light.

5.6- Consider a modification to the experimental setup, as shown in Figure 5.2. In the experiment represented by Figure 5.1, care was taken to insure that the path lengths traveled by each of the paired photons and the length of the signal paths from the optical detectors to the coincidence detectors were equal. This was done to insure that the effect of any velocity that the laboratory might have with respect to space on the transit times of the photons from the source to their respective photon detectors was canceled by the effect of that same velocity on the propagation times of the signals from the photon detectors to the coincidence detectors. As a result, the experiment was unaffected by the velocity of the laboratory with respect to any velocity reference frame arbitrarily chosen to be at rest. In the proposed modification of the experiment, the independence of the results on the velocity of the laboratory through space is eliminated by moving the coincidence detector to the left side of the setup and substituting adjustable delay lines in the signal paths between the left side photon detectors and the coincidence detectors. The adjustable delay lines compensate for the propagation delay of the signals between the right side photon detectors and the coincidence detectors and are adjusted to provide the maximum level of horizontal/horizontal and vertical/vertical detections. The settings of the delay lines which result from that adjustment provides the output data for the experiment.

5.7- Since this experiment differs from the preceding one only in the location of the coincidence detectors and does not differ in the treatment of the paired photons, it will also be capable of demonstrating the hyperlight velocity of coupling of paired photons at the output of its coincidence detector. For that coincidence to be observed the propagation delay of the delay lines must be adjusted to be equal to the propagation delay of the signal in the cable which couples the photon detectors at the right side to the coincidence detectors. The average of the settings of the delay lines provides the output data of the experiment. If one arbitrarily assigns a velocity of +V to represent the absolute velocity of the laboratory through space in a direction to the right, it should be possible to determine that velocity from the average delay, T_{av}, set into the delay lines. As observed in a velocity reference frame which is at rest, the velocity of propagation of the signal through the cable is increased by V and becomes C+V, and the setting of the delay line must be changed from its nominal value of $T_{av}=C/L$ to compensate. The velocity of the laboratory through space is then given by $V=C-T_{av}*C^2/L$.

5.8- Since the value of V is a number which may be broadcast, the measured velocity of the laboratory may be transmitted to a series of observers having velocities different from that of the laboratory and different from each other. If the Aether Relativity Theory correctly represents reality, the same number will be received by all of the moving observers and will represent the absolute velocity of the laboratory through space. If the Special Theory of Relativity correctly represents reality, the number which is broadcast from the laboratory will equal zero while the number received by each of the other observers will be equal to the velocity of the laboratory with respect to himself. All of those observers would receive a different number! (If any reader accepts such a result as possible, the author would like to meet him. There is a bridge over New York City's East River that he has been trying to sell for some time.) The success of the paired photon experiment of Figure 5.1 insures the impossibility of a result in which the delay line settings would remain unchanged at

T_{av}=C/L as the Earth rotated on its axis and moved in its orbit.

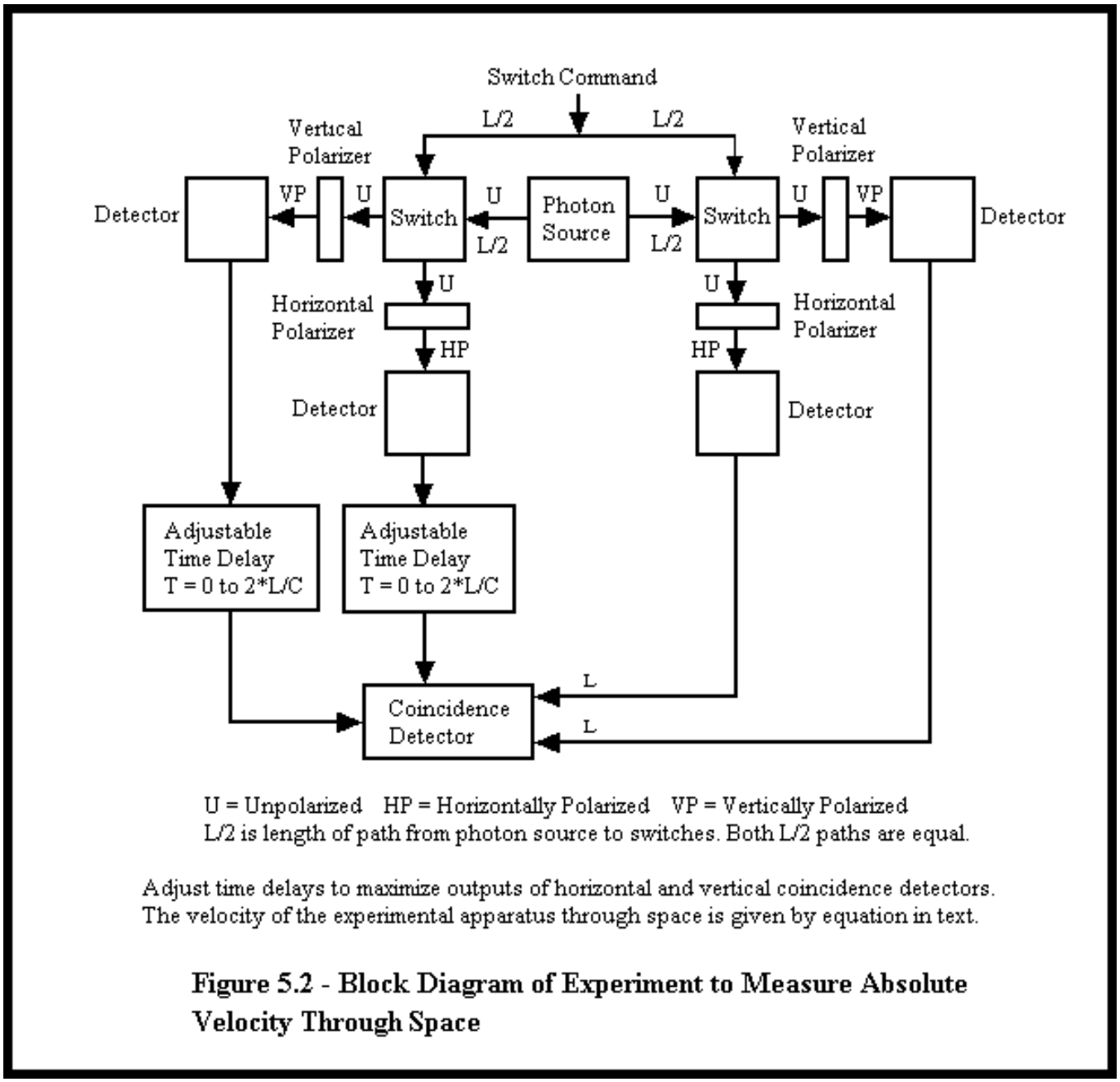


Figure 5.2 - Block Diagram of Experiment to Measure Absolute Velocity Through Space

5.9- The experiment of Figure 5.1 can be modified to eliminate its shortcomings as a communication system by providing a phase coherent carrier for the information to be transmitted by the paired photons. Figure 5.3 shows a means of providing phase coherency of the paired photons by inserting additional polarizers at the photon source which are oriented parallel to each other and at an angle of 45 degrees to the horizontal and vertical polarizers already described. Since the purpose of this experiment is to demonstrate faster than light communication from right to left, the switch is eliminated from the left side of the setup and the detectors at the right side of the setup are replaced by photon absorbers. Data is inputted to the system through the switch at the right side of the setup. In place of the switch at the left side, a crystal is provided which divides the incident light into two polarized beams whose axes are perpendicular. The orientation of the polarizing crystal is chosen such that one of the beams is vertically polarized and the other beam is horizontally polarized. Each of these beams is sensed by a photon detector and the output of those detectors is decoded to provide the received signal.

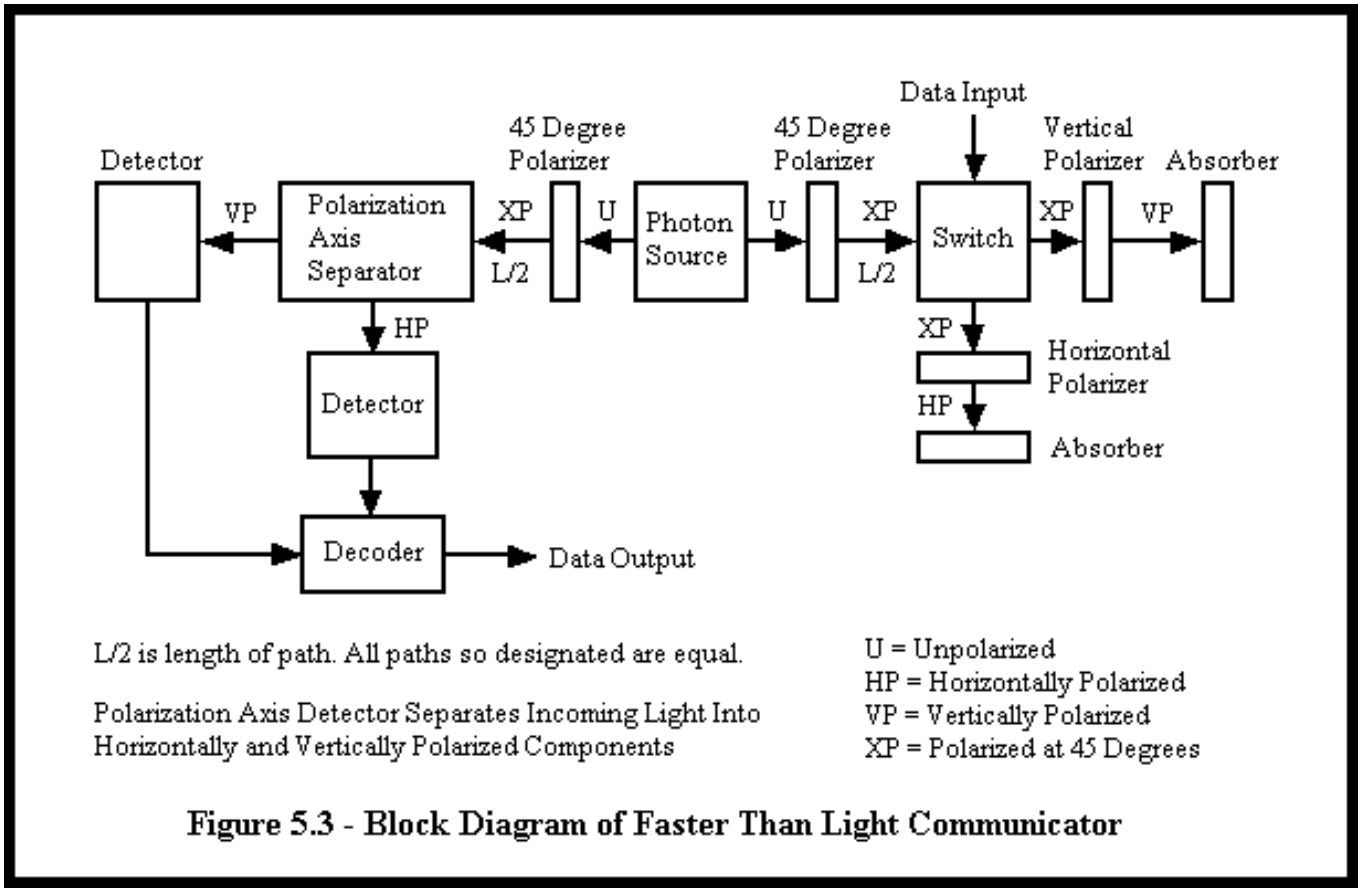


Figure 5.3 - Block Diagram of Faster Than Light Communicator

5.10- Assuming that the addition of the coherency producing polarizers does not interfere with the polarization coupling of the paired photons observed in the experiment of Figure 5.1 (yet to be verified experimentally), the outputs of the decoder at the left side of the setup will contain a signal identical to the signal inserted into the switch on the right side of the setup. A computer simulation to determine the level of the signal received at each detector shows it to be more than adequate to discriminate against noise. As in the arrangement of Figure 5.1, 50% of the photons generated by the photon source will be received (assuming no spurious losses). Of these photons, 75% will be directed to the detector which was selected by the transmitting switch and 25% will be directed to the other detector. The resulting decoder output would then be expected to have a peak to peak amplitude (ideal case) equal to 50% of the photon output of one side of the paired photon source. It would be interesting to have such an experiment performed.

5.11- The Paired Photon Experiment described in Figure 5.1 clearly establishes that the Special Theory of Relativity only survived because the necessary experiments to validate its special case solution, the Aether Relativity Theory, were beyond the state of the art until several generations of physicists had been brainwashed into ignoring the fact that, unlike the Aether Relativity Theory, it contradicted common sense. The idea that quantum numbers, such as polarization, can propagate at an infinite velocity and exhibit many (if not all) of the properties of tachyons does not violate the concept that energy cannot be transmitted faster than velocity of light. The transmission of information does not necessarily require the transmission of energy. Since the energy of a photon does not change as a result of a change in its direction of polarization, there is no prohibition, even in Special Relativity, against information represented by the direction of polarization of paired photons propagating at an infinite velocity. Special Relativity has been experimentally demonstrated to be incomplete. Its special case solution, the Aether Relativity Theory is the correct interpretation of reality, and, for the remainder of this text, its subject matter will be referred to as Velocity Relativity to distinguish it from the relativistic treatment of gravitation which will be designated as Gravity Relativity. *The Emperor does have clothes after all!*

Chapter 6 - The Nature of Reality

6.1- Do The Effects Observed Between Velocity and/or Elevation Reference Frames Occur Because of a Change in Reality or Because of a Change in the Units of Measurement By Which That Reality is Observed?:- In the 19th century, it was universally assumed that there was an underlying reality which existed independently of the means by which it was measured. The Lorentz Contraction-Aether Theory of Relativity accepted this viewpoint, but, under the Special theory of Relativity, the measurement itself became the reality and the reality beneath the measurement became meaningless. To examine the difference between these philosophical approaches, let us consider the implications of a simple thought experiment as shown in Figure 6.1A. In this experiment, there are two rooms each containing identical clocks which may be interchanged without affecting the results. Also in these rooms are electrically operated buzzers activated by a common signal. An experimenter presses a button to sound the buzzers and observers in each room note the time at which the buzzer sounds. An hour later, the experimenter again sounds the buzzer, and the observers in each room again note the time. In room A, the observer reports that one hour has passed between the soundings of the buzzer. In room B, the observer reports that 50 minutes have elapsed. Since the clocks are identical, the philosophy associated with Special and General Relativity asserts that the observations show that time passes more slowly in room B than it does in room A. There is, of course, a problem with this assertion, the duration of time between the soundings of the buzzers was the same in both rooms since they were activated by the same signal and the propagation time for that signal between the rooms is much smaller than the difference in readings of the clocks. Repeating the experiment with the clocks interchanged between rooms yields the same result and shows that a difference between the clocks was not the cause of the difference in the observed durations.

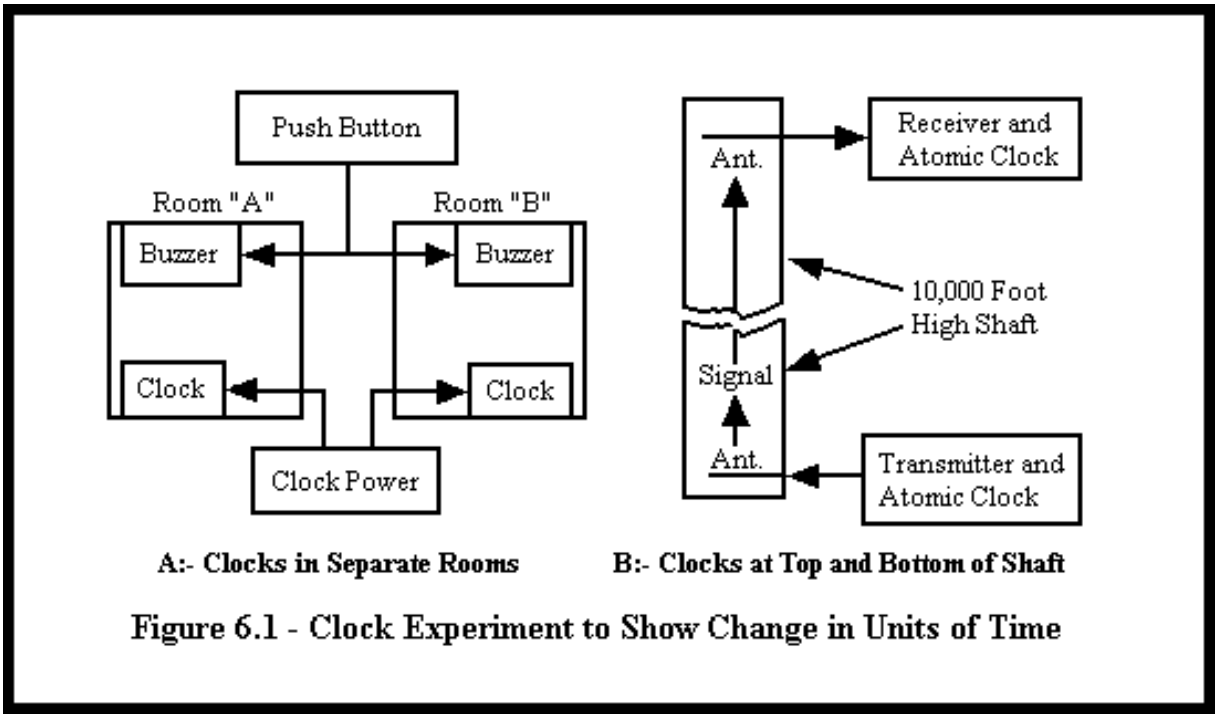


Figure 6.1 - Clock Experiment to Show Change in Units of Time

6.2- The experimental results appear absurd until it is learned that the clocks are of the old fashioned type driven by synchronous electric motors from an external A-C power source. What the experiment actually reveals is that the clock in room A is operated from a 60 Hz. power source, as is conventional in the USA, and the clock in room B is operated from a 50 Hz. power source, as is conventional in Europe. The passage of time reported by each clock was determined by the room in which it was placed as well as by the actual passage of time. To measure the actual passage of time

in each room, it is necessary to determine the effect of that room on the speed of its clock and to correct each observation for that effect with respect to an agreed upon universal standard. Without such a correction, the term GIGO applies to the experiment. (GIGO is an expression formulated in the early days of the computer. It means garbage in = garbage out.)

6.3- The preceding rather fatuous description was provided to show the need for recognizing that, when a quantity is observed using ideal instruments in reference frames which differ in velocity and/or elevation, it is necessary to distinguish between two effects. The effect of interest occurs as a result of a change of the quantity itself. Observation of that effect may be corrupted by a change in the calibration (size of the units of measurement) of the measuring instrument(s) which occurs between the reference frames. The predictions of General Relativity caused measurements to be made which demonstrated that the rate of passage of time slows as the elevation in a gravitational field is reduced. To be objective, one must determine whether the rate of passage of time actually decreases or whether clocks run more slowly (units of measurement for time are larger) at the lower elevation or whether both effects occur in combination. Fortunately, a physically realizable thought experiment can provide the answer.

6.4- Consider next an experimental setup in a vertical shaft drilled into a mountain, as shown in Figure 6.1B. A pair of identical atomic clocks are mounted at the top and bottom of the shaft. The height of the shaft is sufficient, perhaps 10,000 feet, so that the clocks can accurately measure the gravitationally induced difference in the rate of passage of time between the top and the bottom of the shaft. At the start of the experiment, a signal is sent from the bottom of the shaft to the top and the clocks are synchronized. At the end of the experiment, a second signal is sent from the bottom to the top of the shaft and the elapsed time is read on both clocks. Since the duration of the experiment will be affected by any velocity induced difference in the propagation time of the start and stop signals between the elevations, the effect of propagation time error is minimized by making the duration of the experiment equal to four years. This time span insures that the change in velocity of the shaft through space as a result of the orbital motion of the Earth and of its rotation is minimized. With this precaution, the difference in the duration of the experiment between elevations can be reduced to less than one picosecond. Since four years is $1.25*10^8$ seconds, the duration of the experiment is the same at both elevations to an accuracy of better than one part in 10^{20}. The slowing of time, as measured by the difference in readings of these clocks, over the elevation difference of 10,000 feet is about of one part in $3*10^{13}$. To an accuracy of better than 1 part in a million, the difference which will be observed in the duration of the experiment between the upper and lower elevation results from a difference in the speed of the clocks and not from a change in the rate of passage of time. We may conclude therefore that the rate of passage of time is an absolute which is independent of whether a measurement has been made and independent of the characteristics of any instruments might have been used to make such a measurement.

6.5- The preceding paragraph leads to the conclusion that a change of reference frame (elevation or velocity) causes a change in the size of the units of measurement for time (duration of time between the ticks of the clock) by which the clock gauges the passage of time while the rate of passage of time itself is unchanged. If such a conclusion applies to time in a gravitational field, consistency requires that it apply to all other measurements (force, mass, length, etc.) in which relativistic effects are involved. The relativistic theories must then actually be a means of keeping track of the consequences of changes in size of the various units of measurement which occur as a result of a change in velocity or elevation. They do not involve the size of those quantities in the absolute sense.

6.6- <u>The Nature of Mass</u>:- Throughout the science of physics, the concept of mass plays an important role. Subjectively, the meaning of mass was brought home to the writer quite vividly years ago as he stood on a dock while a large freighter was being moored. Apparently the captain of the ship and/or the tugboat crew were not sufficiently skilled, and the ship was pushed toward the dock at a speed equivalent to the crawl of a sleepy turtle. The ship contacted the group of pier supports, each composed about a dozen 12 inch diameter wooden pilings, and kept right on

moving. Despite its extremely slow speed, before the ship came to rest it had pushed the massive pier supports about four feet sideways and made necessary a significant degree of dock repair. One only need to observe such an occurrence to appreciate the significance of the ship's inertial mass.

6.7- In the above experience, the author did not actually observe the mass of the ship, he observed the effects of the force which resulted when the pier supports attempted to lessen the ship's velocity. Observation of such a force is the only manner in which one can measure the inertial mass of any object or particle. Inertial mass cannot be observed directly. It can only be observed as the incremental impulse (force-time product) required to produce an incremental change in velocity (length/time quotient) and is more properly defined in terms of force, length and time. Similarly, gravitational mass is observable only in terms of force, length, and another known gravitational mass in accordance with Newton's Law of Gravitation. Finally, if one considers the equivalence between mass and energy, Thomson's $E=M*C^2$, one notes that only two of the three terms in that equation are independent. Since, unlike mass, both the velocity of light and energy are directly observable, mass must be a dependent variable without existence as an entity in its own right.

6.8- The misapplication of the concept of mass has led physicists to some weird conclusions. For example, the photon and the neutrino are considered to be massless particles despite the fact that they represent the presence of energy and have inertial and gravitational properties consistent with the level of that energy. (In the author's text "Gravity", it is shown that the gravitational mass represented by the energy of a photon or neutrino is twice that of the gravitational mass of the same quantity of energy in a the form of a material particle.) The reason that photons and neutrinos are called "massless" particles is that they do not possess mass when they are at rest. Since these particles only exist when they travel at the velocity of light, their designation as "massless" particles would seem to be rather frivolous. More damaging, the designation of these particles as massless obscures the fact that the gravitational mass of the background radiation in our universe exceeds the gravitational mass of its matter by a wide margin. This faulty definition has caused astronomers and cosmologists to spend a great deal of effort in searching for the dark matter needed to account for gravitationally induced behavior observed throughout the Universe. A rough calculation shows the so called "massless" particles easily contain enough gravitational mass to account for that behavior. The inertial mass of the so called "massless" particles also provides sufficient radiation pressure to prevent the Universe from contracting due to gravitational arrtaction.

6.9- The classical concept of inertial mass is the incremental change of total energy, (dE), resulting from an incremental change in velocity, (dV). Because $E=M*C^2$, it follows that $(dM)=(dE)/C^2$, and, in terms of that definition of mass, the effect of mass is more properly provided by the derivative of the conventional Lorentz Transformation for Mass with respect to velocity, the Lorentz Transformation for Incremental Mass. The curves of Figure 6.2 provide the relationship between the both the mass and the incremental mass of an object as a function of its velocity. It will be noted that the Lorentz Transformation for Incremental Mass is the slope (first derivative) of the curve for the Lorentz Transformation for Mass. When the Lorentz Transformation for Incremental Mass is employed in the solution of relativistic problems, mass has the correct dimensional content and the discrepancy between its use in classical problems and its use in relativistic problems vanishes. Special Relativity's artificiality of substituting momentum for mass is no longer required.

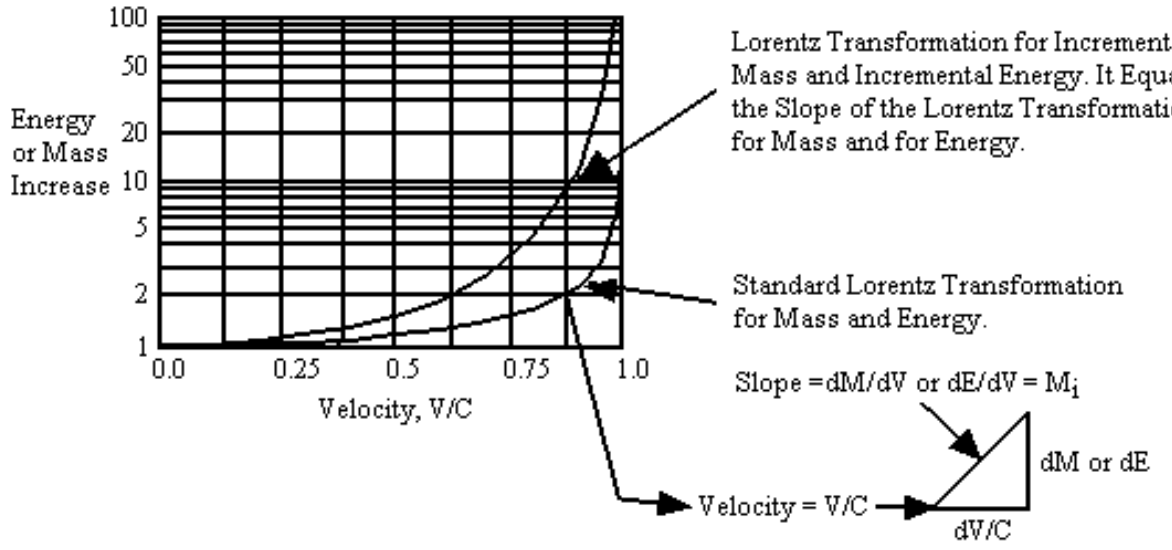


Figure 6.2 - Lorentz Transformation for Energy and Mass and for Incremental Energy and Incremental Mass

6.10- The use of the Lorentz Transformation for Mass instead of the Lorentz Transformation for Incremental Mass led to the false conclusion that, since Special Relativity was derived for reference frames having relative velocity, it could not be applied to accelerated reference frames. That conclusion is incorrect. Both Special Relativity and the Aether Relativity Theory provide transformations for both length and time. Since velocity is the first derivative of length with respect to time and acceleration is the second derivative of length with respect to time, if Special Relativity and/or Aether Relativity can deal correctly with the effects of velocity, they must also be able to deal correctly with the effects of acceleration. Contrary to dogma, General Relativity is not required for that purpose.

6.11- The Mechanism Behind the Lorentz Transformations:- The Lorentz Transformations provide a description of how matter behaves when its velocity is changed so that the Principle of Relativity is satisfied and observers moving with that matter can always consider themselves to be at rest. It is desirable to describe how these transformations come about in a manner which is consistent with common sense so that the effect can be readily understood and is not beclouded by mathematical obfuscation. In order to measure a length, one might use a yardstick (or meterstick if you prefer) as the unit of measurement. In the ideal case, the length of this yardstick is composed of a chain of atoms whose overall length is determined by the number of atoms in the chain and the distance between them. If the velocity of the yardstick is changed, the spacing between the atoms in the chain may change, but the number of atoms in the chain will not. The problem of determining lengths then boils down to determining how atoms control their spacing. For example, the two atoms in a hydrogen molecule maintain a separation of slightly over 10^{-10} meters and strongly resist any outside forces attempting to change that spacing. Since the spacing between the atoms represents a distance of 10^5 times the diameter of the proton in which 99.95% of the mass of the atom resides, it is obvious that the atoms have some means of measuring their separation and applying the forces needed to maintain that separation over what, to the atom, is an enormous distance.

6.12- In the macroscopic world, there are three means by which distances can be measured by electromagnetic means. They are triangulation, the radar principle, and comparison of the time

difference between two signals which propagate at different velocities (e.g.- the difference in time between the observation of a lightning flash the obervation of the sound of the flash). Triangulation, however, requires the pre-existence of a baseline of a known length, and, while it might seem to answer the question of how two hydrogen atoms might measure and maintain their separation, it is not a viable explanation because it requires that there be an independent means of defining the baseline. Triangulation does not resolve the problem, it merely moves it to another location. The radar principle does not suffer from this limitation and would seem to be a reasonable candidate. The recognition, however, that Bell's Inequality shows that quantum effects propagate at an infinite velocity suggests that the comparison of time difference (the sound of thunder and the flash of lightning) is a more probable mechanism (circa 2003). (The writer rejects as foolishness the idea of Parallel Universes.) This mechanism requires the existence of an entity exists which propagates at a fixed velocity through the apparently empty space between the atoms. Electromagnetic radiation propagating through an Aether fills this role nicely.

6.13- To bring the process into the common sense world, consider an example in which two boats are station keeping with respect to each other and with respect to an indefinitely long straight bulkhead along the shore, as diagramed in Figure 6.3. The only instrumentation which these boats have to allow them to perform their station keeping function operates by sending sound waves through the water. On each boat, time is measured by a sonic clock whose unit of measurement is the round trip time of a sonic signal sent vertically from the bottom of the boat to a plate mounted a short distance below and reflected back to the boat. Each boat also sends a sonic signal to the bulkhead and measures the time, using its sonic clock, required to receive the reflection of that signal. It is then steered so as to maintain that time unchanged. Finally, a sonic signal is sent from the following boat to a retroreflector on the rear of the leading boat. The retroreflector returns that signal to the following boat. The rear boat adjusts its speed to maintain the time for the round trip signal, as measured by the sonic clock, unchanged.

6.14- The time required for sound to travel though water between two points is determined by three parameters, one of which is dependent on the velocity of the points of transmission and reception through the water. First consider the case of the round trip signal between the following boat to the leading boat. While the signal is traveling through the water, it propagates at the velocity of sound in the water, C. When the signal is sent from the following boat to the leading boat which is a distance L ahead, the receiving point is running away from the signal at the speed of the boat, V, and the time required for the outward trip is given by $T_o=L/(C-V)$. When the signal is returned, the following boat approaches the signal at the speed of V, and the time required for the return trip is given by $T_r=L/(C+V)$. The time for the round trip, T, is the sum of these times, $T=2*L*C/(C^2-V^2)$, or $T=2*L/B_V^2$ where $B_V = (1-V^2/C^2)^{0.5}$.

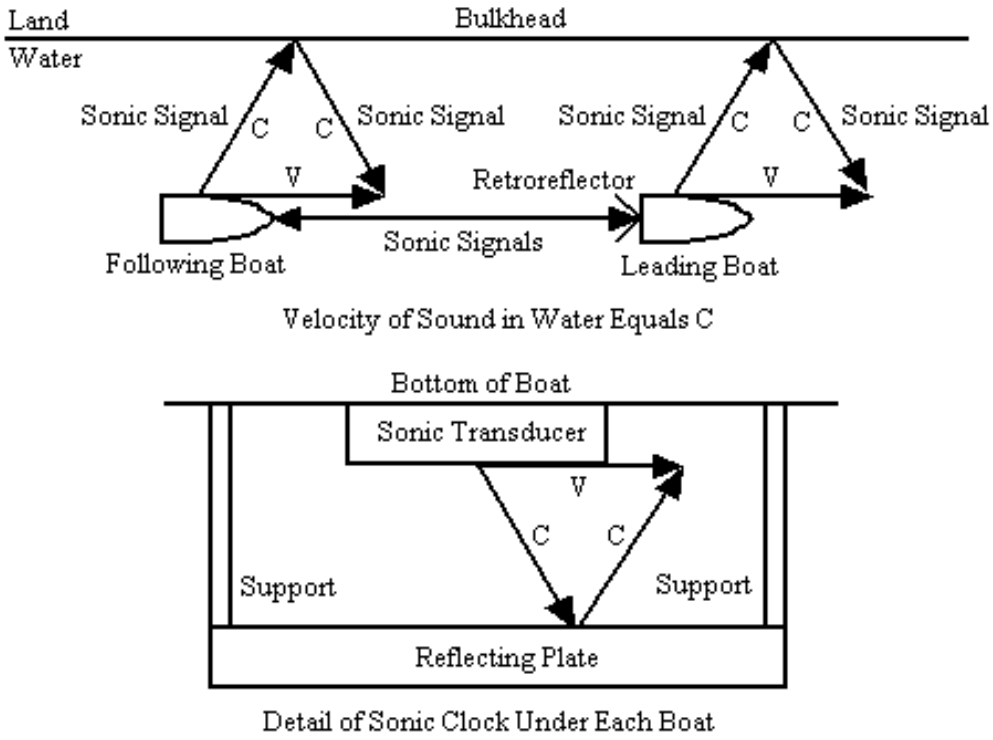


Figure 6.3 - Station Keeping Boats Traveling at Velocity V

6.15- When the signal is sent in a direction at right angles to the velocity of the boats, as occurs in the case of the signal of the sonic clock and in the signal reflected from the bulkhead, a different result occurs. While the signal is en route, the receiving point moves laterally by an amount determined by the velocity of the boat and the time for the signal to make the round trip. As a result, the round trip signal has traveled a distance equal to the vector sum of twice the nominal distance to the target plus the distance that the boat has traveled during the round trip. For this situation, the distance the signal has traveled during the round trip has been increased by $C/(C^2-V^2)^{0.5}$, or $1/B_V$, in accordance with the Pythagorean Theorem for the sides of a right triangle. The effect causes the round trip time for the signal between the boat and the bulkhead to increase by the same ratio and also reduces the speed of the sonic clock by $(C^2-V^2)^{0.5}/C$, or B_V. With respect to the measurement of the distance between the boats and the bulkhead, the two effects cancel, and the distance the boats maintain from the bulkhead is independent of their velocity through the water. Unlike the situation occurring with the round trip of the signal to the bulkhead, the increase of the round trip time for the signal traveling between the following and leading boats is only partially canceled by the slowing of their sonic clocks. For this situation, the round trip time is increased in proportion to the square of the slowing of the sonic clock. In order to maintain correct separation between boats, as measured by signals sent through the water, it is necessary for the operator of the following boat to move closer to the leading boat. He must reduce the distance between the boats by a factor of $(1-V^2/C^2)^{0.5}$, or B_V.

6.16- To confine the analogy further, let us assume that the observers on the boats can only communicate between the two boats and between each boat and the bulkhead by means of sonic signals sent through the water. With this limitation, their only means of measuring the velocity of their boats through the water would be by timing a round trip signal between the boats using their sonic clocks. As a result, they would always measure their velocity through the water as zero regardless of their actual velocity. This is exactly analogous to what occurs in the processes

described both by the Special Theory of Relativity and by the Aether Relativity Theory. If we allow the boats to communicate by radio as well as by sonic signals, they would quickly discover that clocks which were supposedly synchronized by the sonic signals sent through the water were not actually synchronized. The clock in the lead boat would be be set to an earlier time than the clock in the following boat. The amount of time that the leading clock is early would provide the information required to calculate the velocity of the boats through the water just as the ability to communicate at a velocity significantly greater than the velocity of light would allow us to determine our absolute velocity through space by establishing an absolute time reference. (Obviously, real clocks do not function in the manner of the sonic clock described above, but they obey the same Lorentz Transformation for Time as a function of their absolute velocity through space as does the sonic clock as a function of its velocity through the water. The Lorentz Transformation for Time will be discussed later.)

6.17- If we extend the station keeping analogy to a long convoy of boats, we obtain an analogy to a yardstick in which the separation of its atoms (and therefore its length), and the speed of its clock both are determined by the velocity though the medium (water or the Aether). The length of that yardstick obeys the Lorentz Transformations for Length in both axes. As a result, it is impossible for observers to determine their absolute velocity through space. Matter adjusts its size and clock speed to conceal that velocity. The concealment is made possible by the fact that the establishment of simultaneity between physically separated locations is limited by the finite velocity of propagation of information imposed by the speed of light. We cannot observe our absolute velocity through the Aether because Nature uses the velocity of light to determine the size of the matter which comprise our instruments.

6.18- The Impossibility of Measuring the Velocity of Light:- The velocity of light is a sacred and immutable quantity in the scientific community, no matter where or how or by whom it is measured, it always has the value of 186,236 miles per second. The quantity is so basic that its measurement is often part of the training process for PhD candidates. Now for the ultimate heresy. *The velocity of light has never been measured and it never will be measured!* When experiments which purport to measure that velocity are examined, it is found that they violate one of the basic rules of measurement. When making a measurement, it is necessary to compensate for any effect that the quantity being measured has on the scale factors of the instruments which are used. To the author's knowledge, this step has never been included in the measurement of the velocity of light.

6.19- Consider an attempt to measure the velocity of light in which a measurement is made of the time required for a pulse of light to be sent from the top of one mountain to a retroreflector on the top of an adjacent mountain and returned to its source. The experiment requires the use of a precise clock and a precise knowledge of the distance between the signal source and the retroreflector. Atomic clocks of extreme precision and accuracy are available and are readily transportable to the mountaintop. Determining the distance between the light source and the retroreflector is difficult since it involves precision surveying over a long distance of mountainous terrain. To overcome the difficulty of the survey, it is decided to measure the distance to the retroreflector by radar. The resulting experiment produces the correct value for the velocity of light. It concludes that C=C. Unfortunately, while such a result is correct, it is hardly useful.

6.20- While this example may appear frivolous, it is not. It is a valid analog of reality. Quantum physicists have concluded that the force between material particles is electromagnetic in nature and it is asserted to result from the exchange of virtual photons. As a result, they are also asserting that the spacing between these particles is determined by the radar principle or its equivalent and therefore is in agreement with the predictions of Velocity Relativity Theory. Any attempt to measure the velocity of light must yield the meaningless conclusion that the velocity of light is equal to the velocity of light.

6.21- The making of a measurement requires, in effect, the writing of an equation in which the quantity to be measured appears only on the left side of the equal sign and all other quantities

appear only on the right side. If the velocity of light, C, is to be measured, it is necessary that both the time, T, required for light to travel a distance, L, and the distance, L, be measured in a manner which is independent of C. The velocity of light may then be found by solving the equation C=L/T. The difficulty arises from the fact that both the measurement of time and the measurement of length involve the velocity of light. The length of the yardstick used to measure the length is asserted to be determined by the alleged exchange of virtual photons between atoms. The speed of the clock is determined by the resonant frequency of an oscillating spring-mass system. One of the factors which determines the frequency of such a system is the elasticity of the spring which is determined by the exchange of the alleged virtual photons between its atoms. The other factor which determines its frequency is the mass of the oscillating system as determined by the energy represented by its mass divided by the square of the velocity of light. Obviously, the equation by which one would expect to use in measuring the velocity of light is not quite applicable.

6.22- While the author has not attempted the derivation, he is drawn to the conclusion that the correct equation for the measurement of the velocity of light is a rearrangement of the Fine Structure Constant, $e'*h*C/e^2=137$, where h is Planck's Constant, e is the charge of the electron, and e' is the dielectric constant of space. (e' is required if the equation is to be dimensionally correct. The current practice of omitting it from the equation of the Fine Structure Constant is erroneous.) With this rearrangement, the equation for the measurement of the velocity of light becomes $C=137*e^2/(e'*h)$. The reality of Relativity is that matter adjusts its size to satisfy this equation and any measurement which attempts to measure the velocity of light actually measures the Fine Structure Constant. Since this constant is dimensionless, it is the same at all velocities through space and at all elevations. Unless a physicist has been completely brainwashed during his education, he will recognize that the observed constancy of the velocity of light is not mysterious, it is inevitable and is completely unrelated to the actual velocity of light.

6.23- In Figure 6.4 three velocity reference frames are considered, "x", "a", and "b". It will be noted that, in accordance with the concepts of both the Special Theory of Relativity and the Aether Theory of Relativity, the relative velocity of "b" with respect to "x", V_{bx}, is provided in terms as the sum of the velocity between "b" and "a", V_{ba}, and the velocity between "a" and "x" as the sum of V_{ax} and V_{ba} divided by a factor, $1+V_{ax}*V_{ba}/C^2$. The denominator is required to compensate for the effect of the finite velocity of light on the measurement of the velocity differences. It is the effect represented by this term which prevents the direct addition of relativistic velocities and which prevents the observed difference of velocity between any two reference frames from exceeding the velocity of light. The denominator in the equation results from the limitation that the velocity of light imposes on the velocity of communication between reference frames. (The denominator becomes unity if the experimenter communicates at an infinite velocity, possibly through the use of paired photons.) If the product $V_{xa}*V_{ab}$ in the denominator is small compared to the square of the velocity of light, its effects can be ignored, non-relativistic mechanics are valid, and velocities may be added directly. This conclusion will become important when we examine the deficiency of Special Relativity with regard to accelerations.

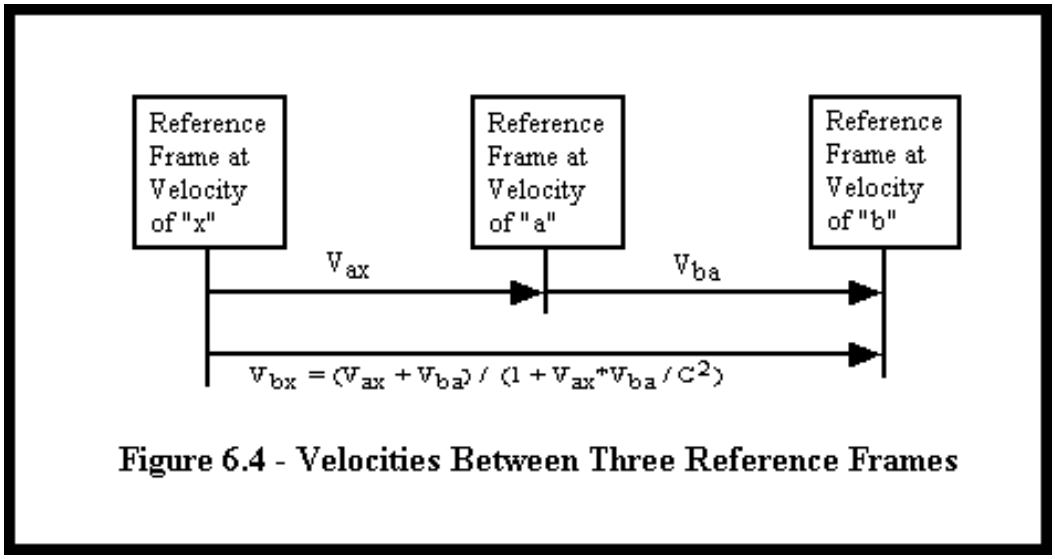
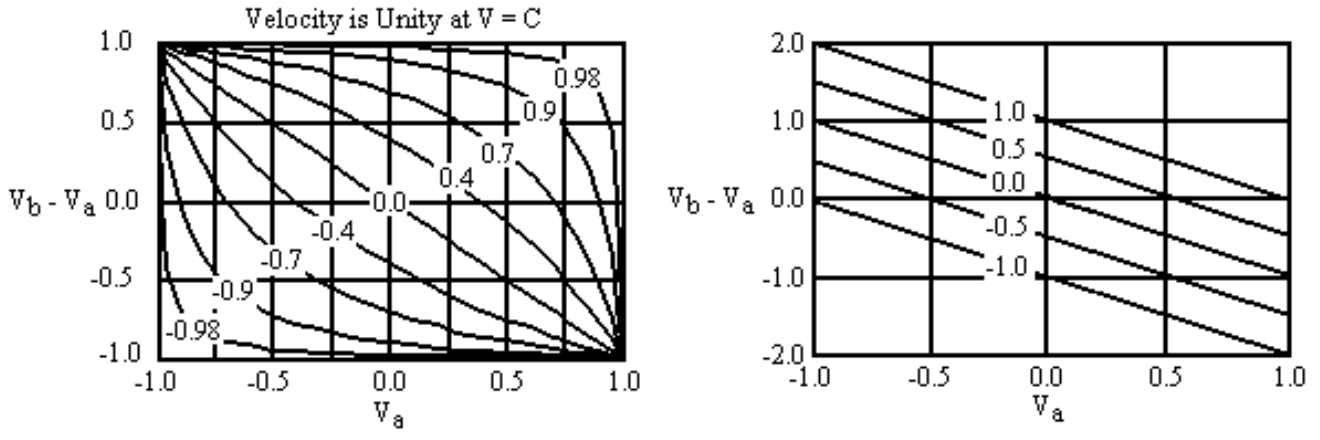


Figure 6.4 - Velocities Between Three Reference Frames

6.24- Consider that observers in reference frames "a" and "b" of Figure 6.4 wish to make observations between their reference frames. In order to insure that their observations are based upon the same reference frame, they agree to convert the results of their observations into observations as they would have been made in reference frame "x". After making observations within and between reference frames "a" and "b" they convert those results into the results which would have been observed in that reference frame and communicate those results to each other. After laborious manipulation of many pages of algebra they find that all of the terms in the equations which refer to reference frame "x" cancel and they are left with only those terms which refer to the effects occurring in and between velocity between reference frames "a" and "b". Reference frame "x" does not exist in the solution, and, allowing that reference frame "x" represents the velocity reference frame of the Aether, it becomes obvious why our velocity with respect to that Aether cannot be observed.

6.25- The addition of velocities as defined by the Special Theory of Relativity and by Aether Relativity produces a conflict with common sense. Under Special Relativity, when one adds the velocity of one reference frame to the velocity of another reference frame, the denominator in the velocity addition equation described above insures that the velocity difference between those reference frames is not equal to the algebraic difference. When the velocities approach the velocity of light, the effect is so pronounced that, when the algebraic velocity difference approaches twice the velocity of light, the observed velocity difference remains less than the velocity of light. (See Figure 6.5A. The strange nature of this curve results from the fact that, under Special Relativity, observers in reference frames "a" and "b" are both free to consider themselves at rest and that the other observer is moving. Both conclusions cannot be true, and as above, the only conceptually valid means of dealing with the observations is for the observers in both reference frames to agree upon a reference frame which they accept as stationary and to use the mathematics of either Special or Aether Relativity to convert their observations to the results which would be obtained if the observations had been made in the stationary reference frame. When that step is taken, the addition of velocities between reference frames "a" and "b" becomes consistent with common sense. (See Figure 6.5B.) Under the Aether Relativity Theory, the confusion about the adding of velocities does not occur, the absolute velocity reference represented by the Aether forces the observers to make the necessary corrections to their observations.



A:- The Relativistic Addition of Velocities. This is what we observe.

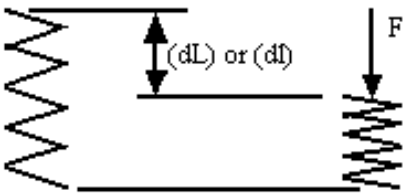
B:- The Actual Addition of Velocities. This is what actually occurs.

Figure 6.5 - The Relativistic and Actual Addition of Velocities

6.26- At this point, a conventional relativist will ask why it should be necessary to assume the existence of an artificially selected velocity reference frame when that reference frame does not appear in the data. Perhaps the simplest response to that question is to direct the reader's attention to the problem of navigation on the surface of the Earth. A position on the Earth's surface is defined in terms of its latitude and longitude. The observation of latitude presents no problem, the equator provides an observable absolute reference for zero latitude at a location 90 degrees away from the spin axis of the Earth. The observation of longitude does present a problem. There is no absolute reference for zero longitude. Our ancestors, however, were practical men. They arbitrarily defined the zero meridian of longitude as passing through Greenwich England and based all observations of longitude upon that artificially chosen absolute longitude reference. *In order for an observation to produce rigorously correct results between reference frames, compensation of the effects of the difference in reference frames on the units of measurement is required. This, in turn, requires that a reference frame be arbitrarily chosen as a standard. If this step is not taken, GIGO prevails.*.

6.27- The Location of Kinetic Energy:-

When a bullet is fired from a gun, kinetic energy is added to the projectile by the expanding gases in the gun barrel. That kinetic energy is eventually imparted to the target, but during the time of the bullet's flight, it travels with the bullet. The Lorentz Transformations may be used to determine the location of that kinetic energy. That determination is readily made with the use of a thought experiment. Consider that the mass equivalent energy of each particle composing the bullet has been stored in ideal massless springs by compressing and tying them, as shown in Figure 6.6. Since the action of the spring is one dimensional, energy is stored along a single axis. Consider next that the particles in the bullet consist of three springs with identical energies of compression mounted orthogonal to each other with one of each set of springs being parallel to the bullet's projected path. Since, for our thought experiment, the springs themselves are considered to be massless, the only mass the particles in the bullet possess is the energy stored by the compression of the three springs.



Relaxed Spring

Compressed Spring

$e_T = f_T * (dl_T)/2$

$E_T = F_T * (dL_T)/2$

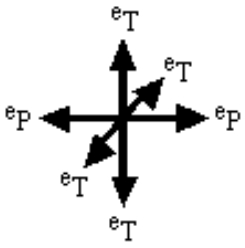
$E_T = e_T * (1 - V^2/C^2)^{0.5}$

$e_P = f_P * (dl_P)/2$

$E_P = F_P * (dL_T)/2$

$E_P = e_P * (1 - V^2/C^2)^{0.5}$

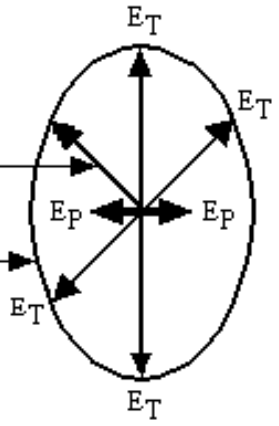
Spring is considered to be ideal and massless with only the energy stored in the spring having inertial mass.



Energy From Parallel Spring to Stress Disk in Space $E_T*(V^2/C^2)/(1-V^2/C^2)^{0.5}$

Disk of Stress in Aether which is Perpendicular to Velocity Vector and Moves With Object.

Velocity Vector



"Stationary" Reference Frame

"Moving" Reference Frame

Object consisting of energy stored in three mutually perpendicular springs as observed in "moving" and " stationary" reference frames. When local reference frame is " stationary", $e_T = E_T$ and $e_P = E_P$.

In moving object, energy stored in the transverse springs is increased in proportion to the sum of the stored energy plus its kinetic energy.
The energy stored in the parallel spring is reduced in proportion to the Lorentz Transformation and equals zero at V = C. The remainder of the stored energy and the kinetic energy of the parallel spring, equal to V^2/C^2 times the total energy, is transported as a perpendicular shock wave in a disklike region of the Aether which moves with the object.

Figure 6.6 - The Location of Kinetic Energy

6.28- When the springs acquire a velocity, the acquisition of that velocity causes kinetic energy to be added to the energy of compression which had been stored in them. Applying the Lorentz Transformation for Mass and multiplying by the square of the velocity of light shows that the total energy of the springs has been increased in proportion to $1/B_v$. The product of the Lorentz Transformation for Transverse Length times the Lorentz Transformation for Transverse Force shows that the energy stored in the transverse springs has been increased by the same factor. For these transverse springs, therefore, it is apparent that their kinetic energy is stored as an increase in their energy of compression and that stored energy is returned when the bullet is brought to rest. In the parallel axis, the situation is more subtle. The product of the Lorentz Transformation for Parallel Force times the Lorentz Transformation for Parallel Length, and therefore the total energy transported within the spring itself, has been decreased by the factor B_v even though the total energy transported by the energy stored in the parallel spring has been increased by the factor

$1/B_v$. For this to occur, the acquisition of velocity by the parallel spring requires that an amount of energy equal to $V^2/(C^2*B_v)$, times the energy stored in the parallel spring leave that spring and yet travel along with it. The motion of the parallel spring must cause the energy that has left the parallel spring to be stored in a disk shaped region of space located in a plane perpendicular to the velocity vector and which moves with the parallel spring. For that energy to be stored, the Aether must be distorted and stressed in the region involved. For Newton's Laws of Motion to be valid, the interchange of energy between the source/sink of kinetic energy and both the springs and the disk shaped distortion and stress in the Aether must occur at 100% efficiency. It also follows that the inertial forces associated with a change in velocity are not fictitious as modern physicists would have you believe, they are, like the force of gravity, a real force exerted against the Aether.

6.29- <u>A Model for the Neutrino?</u> In the previous paragraphs it was pointed out that the Lorentz Transformations for Force and Length require that part of the rest mass energy and all of the kinetic energy associated with energy stored in a direction parallel to the velocity vector must be transported in a disk shaped region of stressed space moving with that energy. One would conclude, however, that if the original rest mass energy were greater than zero, the energy stored in the disk would become infinite, exactly as would the energy stored in a direction perpendicular to the velocity vector.

6.30- Let us consider a situation in which the rest mass energy is stored only in a direction parallel to the velocity vector. As shown in Figure 6.6, the energy stored in the spring is given by $E_s=e_p*(1-V^2/C^2)^{0.5}$ and the energy stored in the disk of stressed space is given by $E_d=e_p*(V/C)^2/(1-V^2/C^2)^{0.5}$. Now let us consider that the amount of the original rest mass energy is reduced as a function of the velocity, V_f, to be attained (a series of experiments is required, one for each of the final velocities, V_f) so that the energy in the disk will approach the nominal rest mass energy, e_p, as the V_f of the individual experiments approaches C. This can be achieved by reducing the initial rest mass energy, e_p in proportion to $(1-V_f^2/C^2)^{0.5}$. The expression for the energy transported by the spring for each of the values of V_f becomes $E_s=e_p*(1-V_f^2/C^2)$ and the energy transported by the disk of stressed space for each of the values of V_f becomes $e_p*(V_f/C)^2$.

6.31:- Let is now consider values of V_f which approach the value of C as a limit. As V_f approaches C, the portion of the total energy stored in the spring approaches zero as a limit while the portion of the energy which is stored in the disk approaches the original rest mass energy as a limit. A direct determination of the energy in the spring when V_f equals C is obvious, it is zero. A direct determination of the energy in the disk would appear to be meaningless since it would involve the multiplication of zero by infinity and, as a result, can have any value between the limits of +/- infinity. The actual value can be determined however by using the same procedure as is used in integral calculus, allowing V_f to approach infinitesimally close to C and determining the amount energy in the disk when the velocity of C is a limit. This approach allows us to conclude that, when V_f is equal to C, all of the energy is stored in the stressed disk in space and none of the energy is stored in the spring. In the case under consideration, the amount of the energy stored in the disk is equal to the energy e_p. We have now described a particle Figure 6.7 which does not have a charge, possess no rest mass, travels at the velocity of light and transports energy and momentum. Has a neutrino been described? The author believes it has.

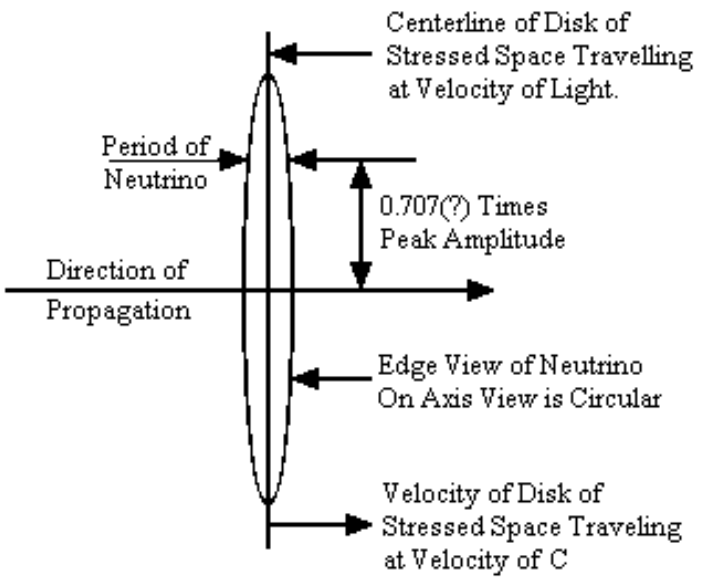


Figure 6.7 - Instantaneous Side View of Neutrino

6.32- How Could Such a Neutrino be Launched and/or Absorbed? The mechanism of launching or absorbing a neutrino which was constructed as described in the proceeding two paragraphs might seem to pose a conceptual problem. This would be the case if the formation of the neutrino involved an acceleration from rest to the velocity of light and/or if the absorption of the neutrino involved a deceleration from the velocity of light to the rest velocity. There is no conceptual difficulty however if the neutrino were formed or absorbed already traveling at the velocity of light. Such an emission/absorption characteristic is already known. When photons are emitted or absorbed, the process involved behaves in exactly this manner, at least when observed for a time which is longer than the period of the photon. One would expect such neutrinos to have a discrete frequency just as the photon has a discrete frequency and one would expect it to be emitted and absorbed in discrete quasi-spectral lines analogous to the absorption and emission of the spectral lines of photons from atoms. If neutrinos are emitted by nuclear processes in a star, frequency shifts due to thermal Doppler and of gravitational time dilation should greatly reduce the observable emission of neutrinos by a star. At present, experimenters are trying to account for the fact that the neutrino emission from the Sun is about a third of what they expect. Perhaps the emission spectrum of the neutrinos is sufficiently broadened so as to prevent their detection by present methods.

Chapter 7 - Applying the Lorentz Transformations Properly

7.1- In the gravitational field, it has been predicted and experimentally verified that differences in elevation result in differences in the observed rate of passage of time. Earlier in this discussion, it was shown that the difference occurs because a change in elevation changes the calibration of clocks and does not, in contrast to present dogma, affect the absolute rate of the passage of time. Since a change in reference frame (elevation) changes the speed of a clock, it is not only reasonable to expect that the scale factor of other types of instruments also be affected, the rules of

Dimensional Analysis and the Principle of Relativity require that such be the case. If one is to examine the effects of velocity and/or elevation therefore, it is necessary for him make observations within each of the reference frames using the units of measurement of that reference frame (local units of measurement). He must then choose a standard velocity reference frame and a standard elevation reference frame and use the Velocity and/or Gravity Transformations to convert the results of his observations into those which would have been obtained with the units of measurement of the standard reference frame. The procedure is analogous to the practice employed by surveyors who adjust distances measured with steel tapes for the error caused by the difference between the ambient temperature and the temperature at which the tape was calibrated. Somehow, it seems reasonable that physicists should be expected to adhere to the level of rigor required of the more mundane field of surveying. (It is the change in the speed of clocks resulting from a change in reference frames that produced the Twin Paradox of Special Relativity. There is no paradox. A twin who returned from a high speed trip would be younger than his sibling who had remained stationary because his biological clock would, on average, have run slower.)

7.2- In order to insure that the basic system of units represent directly observable entities, it is necessary to convert the familiar Mass-Length-Time system of units to a Force-Length-Time system. (For a definition of the basic units of this system see Table 7.2.1.) Unlike force, which is directly observable and is a fundamental entity in its own right, mass has no independent existence and cannot be directly observed. The mass of an object (or particle) can be observed in one or more of three ways. It can be observed in terms of its inertia as the incremental impulse (force-time product) required to produce an incremental change in velocity (length/time ratio). It can be observed in terms of the gravitational force between the energy (force-time product) equivalents of two masses divided by the square of their separation (length-length product). Or it may be determined by the energy (force-length product) released when the object is converted to radiation. Accepted texts on Special Relativity correctly provide the Lorentz Transformations for Time, Parallel Length, Transverse Length, and Parallel Force. Unfortunately, an unrecognized error was been made in the derivation of the Lorentz Transformation for Transverse Force. The transformation provided in texts is $1/B_v$ whereas the correct transformation is B_v. The existence of this error is revealed by the Right Angle Lever Paradox discussed below. (A rigorous derivation of the Lorentz Transformations for Parallel and Transverse Force is provided in "Corrections to Errors in Special Relativity" as provided at this Website.)

Table 7.2.1:- Revised Lorentz Transformations

Quantity	Dimensional Entity	Parallel Transformation	Transverse Transformation
Force	F	1	B_v
Length	L	$1/B_v$	1
Time	T	B_v	B_v

$B_v=(1-V^2/C^2)^{0.5}$

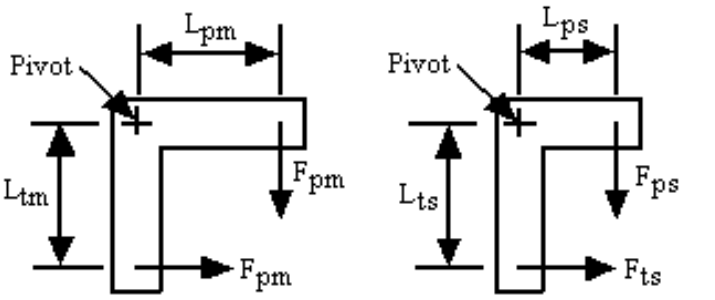
Note on Table 7.2.1:- Current texts erroneously provide $1/B_v$ as the Lorentz Transformation for Transverse Force.)

7.3- Two errors in present Velocity Relativity Theory have been eliminated. The first error was eliminated by the recognition that inertial mass is properly represented by its incremental mass, M_i, because inertial mass refers to effects which occur under conditions where the change in

velocity is small. This correction allows the mathematics of Velocity Relativity Theory, as Special and/or Aether Relativity Theory will designated from this point on, to be valid for accelerated reference frames. Indeed they must be valid for accelerated reference frames since acceleration is the second derivative of length with respect to time and both terms are subject to their respective Lorentz Transformations. The second error is eliminated by providing the correct Lorentz Transformation for Transverse Force. With these corrections, it is possible to provide the Lorentz Transformations based upon a Force-Length-Time system of units rather than the conventional Mass-Length-Time system.

7.4 A paradox, known as the Right Angle Lever Paradox, was discovered early on in discussions of the Special Theory of Relativity. As is the case with all paradoxes, its existence revealed that an error has been made. The error occurred in the initial derivation of the Lorentz Transformation for Transverse Force and correcting that error eliminates the paradox. (The correct transformation is readily derived and is provided in "Special Relativity Corrections" available on this Website.) However, instead of recognizing its existence and working to find the source of the error, the academic community elected to accept the erroneous Lorentz Transformation for Transverse Force as correct and seek an esoteric method of resolution. After all, a religion had been established and it would not do for priests of that religion to admit to having been in error.

7.5- The Right Angle Lever Paradox is illustrated in Figure 7.1. Consider the condition where a right angle lever having equal length arms in its own reference frame is moving with respect to a reference frame which is considered to be stationary. A force is applied to the end of one of the arms of the lever which is prevented from rotating by an equal force applied to the other arm. Since the lever is observed not to rotate in either the stationary or the moving reference frame, it follows that the net torque applied to it in each of the reference frames is zero. From the diagram we may write, for the moving reference frame, $F_{tm}*L_{pm}=F_{pm}*L_{tm}$ and, since the arms are of equal length in that reference frame, it follows that $F_{tm}=F_{pm}$. We should also be able to write $F_{ts}*L_{ps}=F_{ps}*L_{ts}$, but, in the stationary reference frame, the length of the parallel arm, L_{ps}, is reduced by the effects of the velocity in accordance with the Lorentz Transformation for Length, B_v. For the net torque to be zero in the stationary reference frame, F_{ts} must equal to F_{ps}/B_v. Minkowski correctly provided the Lorentz Transformation for Parallel Force as equal to unity but the currently accepted Lorentz Transformation for Transverse Force is the reciprocal of its correct value. This error forces one to conclude that the observed angular acceleration of the Right Angle Lever of Figure 7.1 cannot be zero in both the stationary and moving reference frames. The lever, not knowing this to be impossible, does not undergo angular acceleration in either reference frame and the Right Angle Lever Paradox results.



$L_{ps} = L_{pm}*(1 - V^2/C^2)^{0.5}$

$L_{ts} = L_{tm}$

$F_{ps} = F_{pm}$

Under Special Relativity:-

$F_{ts} = F_{tm}*(1 - V^2/C^2)^{0.5}$

Torques are unbalanced in both reference frames. T_p does not equal T_t.

After Error Correction:

$F_{ts} = F_{tm}/(1 - V^2/C^2)^{0.5}$

Torques are balanced in both reference frames. $T_p = T_s$

Figure 7.1 - The Right Angle Lever Paradox

7.6- To by-pass the need to admit that an error had been made and correcting the Lorentz Transformation for Transverse Force, relativistic theorists devised a rather imaginative explanation. This explanation has appeared in more than one postgraduate text and conflicts so severely with common sense that many teachers of Relativity by-pass the topic despite the brainwashing they underwent in the process of attaining their positions. In this explanation, the rate at which the torque unbalance of the lever, as observed in the stationary reference frame, increases its angular momentum is countered by the rate that energy is added to the lever by the force, F_{ps}. In undergraduate Physics 101 (Mechanics), which is a prerequisite to receiving a PhD in Physics, one is taught that the existence of a moment requires the existence of two equal and opposite forces separated by a distance. In this case, the reaction force components existing at the hinge pin provide the second forces. As a result, any energy added at the end of the lever is immediately removed at the hinge pin and the rate of change of energy in the lever is zero. One is also taught in Physics 101 that the angular momentum of an object is the product of its moment of inertia and its angular velocity. Since the angular velocity of the lever remains zero in both reference frames, the rate of change of its angular momentum is also zero. The supposed resolution of the Right Angle Lever Paradox degrades to the statement that zero equals zero. This conclusion is most certainly true, but it is hardly very useful The only means of resolving the Right Angle Lever Paradox is to correct the error in the Lorentz Transformation for Transverse Force.

7.7- Dimensional Analysis as Applied to Relativistic Phenomena:- While it is not commonly recognized, Dimensional Analysis is the most effective tool available for the investigation of the effects of a change in velocity and/or elevation. Observations are translatable into equations, such as V=(dL)/(dT). [This equation states that the velocity at which an object is moving is equal to the incremental distance it travels, (dL), divided by the incremental time, (dT), required for it to travel that distance.] Usage of Dimensional Analysis is simplified by the fact that only three independent dimensional entities are required. (More than three dimensional entities are found to be redundant.) The dimensional content of every parameter encountered in an observation may be derived from those three entities because each term in an equation describing a physical process or phenomena must have the same content of dimensional entities. Apples must not be equated to oranges.

7.8- While Dimensional Analysis obviously applies within a given reference frame, the Principle of Relativity adds the requirement that, with the appropriate transformations, it must also apply

between reference frames which differ in velocity and/or elevation. (For reference frames differing in velocity, these transformations are the Lorentz Transformations which will be termed Velocity Transformations from this point on. For reference frames which differ in elevation, an equivalent set of transformations termed Gravity Transformations is required.) Combining the rules of Dimensional Analysis with the Principle of Relativity allows the phenomena associated with relativistic effects to be unpeeled so that they may be understood at the common sense level. To facilitate such a use of Dimensional Analysis, Table 7.8.1 provides the dimensional content of various physical quantities. Based upon the earlier discussion of the meaning of mass, the table is based upon the more rational force-length-time (FLT) system of units rather than upon the conventional mass-length-time (MLT) system.

7.9- At this point, it is time to consider the observation of the velocity of light in a reference frame different from the one in which the observer finds himself. Everyone who has been exposed to an undergraduate level course in physics has been exposed to the idea that the velocity of light is constant, yet, as has already been discussed, the velocity of light has never been measured and can never be measured because the calibration of instruments is affected by changes in the velocity of light. The velocity of light is constant only when it is measured by a local observer using local units of measurement.

7.10- Consider the case of an observer in the stationary reference frame in communication with an observer in a moving reference frame. The observer in the moving reference frame measures the velocity of light in a direction along the relative velocity vector using local units of measurement and reports its value as its standard value of C. The observer in the stationary reference frame, knowing that the instruments used to make the measurement in the moving reference frame have been distorted by the effects of its velocity, compensates the reported value of the velocity of light in the moving reference frame using the appropriate Velocity Transformations and obtains $c=B_V^2*C$, which may be rewritten as $B_V=(c/C)^{0.5}$. It follows that the Velocity Transformation term, B_V, is the square root of the ratio of the velocity of light in the other reference frame divided its velocity in the base reference frame. As will be seen, when the behavior of the gravitational field is correctly described, this definition holds for gravitational transformations between elevations as defined in terms of B_g.

Table 7.8.1 - The Dimensional Entities Contained in Various Physical Quantities

Quantity	Symbol	Dimensional Content
Force, F	F	F
Length, L	L	L
Time, T	T	T
Energy	E	F*L
Planck's Constant	H	F*L*T
Velocity	V	L/T
Acceleration	A	L/T^2
Incremental Mass	M_i	$F*T^2/L$
Momentum	U	F*T
Angular Momentum	J	F*L*T

Gravitational Constant	**G**	**$L^4/(F*T^4)$**
Ergo-gravitational Constant	**D**	**1/F**
Temperature	**&**	**F*L**
Charge	**Q**	**L**
Dielectric Constant of Space	**e'**	**1/F**
Permeability of Space	**u'**	**$F*T^2/L^2$**

$B_V=(1-V^2/C^2)^{0.5}$

Notes on Table 7.8.1:-

- **Current texts erroneously provide $1/B_V$ as the Lorentz Transformation for Transverse Force.)**
- **The dimensional content for velocity is unaffected by the relativistic correction term for the addition of velocities since that correction terms is dimensionless.**
- **The dimensional content of the gravitational constant is determined from the expression for Newtonian gravitational force, $F=G*M_{i1}*M_{i2}/L^2$.**
- **The ergo-gravitational constant is the conventional gravitational constant defined in terms of the energy equivalents of the gravitating masses. It is identical to Dr. Einstein's Cosmological Constant and is equal to G/C^4.**
- **Temperature is kinetic energy per available degree of freedom and has the dimensional content of energy.**
- **Evaluation of the dimensional content of the expression for the electrostatic force between charges provides $Q^2/e'=F*L^2$.**
- **Evaluation of the expression for the electromagnetic force between moving charges provides $Q^2*u'=F*T^2$. The velocity of light is given by $C=(e'*u')^{0.5}$.**
    - **If one accepts the precept that the exponent of a dimensional entity must be an integer, there are two possibilities. The first possibility is that the dimensional content of Q is equal to L, the dimensional content of e' is equal to 1/F, and the dimensional content of u' is equal to $F*L^2/(L*T^2)$. The second possibility is that the dimensional content of Q is equal to unity, the dimensional content of e' is equal to $1/(F*L^2)$, and the dimensional content of u' is equal to $F*T^2$. The dimensional content for charge, Q, must equal to the dimensional content for length, L, in order for the Principle of Relativity to apply, and this value, and its related values for e' and u' is chosen for Table 7.8.1.**

7.11- It has been suggested that mass could also be determined by counting particles, and, in response, the following clarification is provided:

- **In attempting to use mass as a fundamental observable entity, care must be taken to insure that the observation of mass does not require knowledge of another mass(es), unless that mass(es) has been determined by an independent means. Otherwise, such an observation**

defines mass in terms of itself, an obvious absurdity.

- **When one determines mass by "weighing", the necessary independent means is available. The laws of orbital mechanics allow the determination of the mass of a primary object to be determined in terms of the orbital period of a satellite and the gravitational constant. The gravitational constant, in turn, can be measured in terms of inertial mass by means of the Eotvos Experiment of Figure 8.1.**

- **In order to determine the mass of an object by counting its particles, a similar independent means of measuring the mass of the particles is required. This process is complicated by the fact that the mass of a compound particle (e.g..- an atom having an atomic weight greater than 1, or a molecule) does not equal the sum of the masses of its component parts (e.g.- the mass of a helium atom is less of the mass of four hydrogen atoms due to the energy released during its fusion). A mass spectrometer could be employed to determine the mass of every particle, atom, or molecule of interest, but, as is the case of "weighing", such usage would define mass in terms of its inertial effects.**

- ***It would appear, then, that a refinement of our understanding is required. There are only two primary means of observing mass. It may be observed by the energy released during annihilation and it may be observed by "shaking". "Weighing" or "counting" are a secondary means of observation which rely on the primary means for their validity.***

Chapter 8 - Generating the Gravity Transformations

8.1- Enter the Principle of Equivalence:- Dr. Einstein made an enormous contribution to our understanding of physical reality by incorporating the Principle of Equivalence into gravitational theory. Proper use of this principle results in the assertion that the effects of velocity and gravity are equivalent and that gravitation is a relativistic phenomena. If that principle correctly applies to the gravitational field, it must be possible to generate Force-Length-Time Transformations between gravitational reference frames which are equivalent to the Force-Length-Time Transformations between velocity reference frames. Once derived, these gravitational transformations allow the actual effects of a change in elevation to be observed and, as shall be seen, will reveal far more about reality than one might reasonably hope.

8.2- It must be pointed out that, in most texts (including the writings of Dr. Einstein), the meaning of the Principle of Equivalence is overstated. It is commonly asserted that there is no observable difference between a gravitational acceleration and an inertial acceleration. This conclusion is not quite true. The force observed as a result of inertial acceleration is always accompanied by an observable change in velocity since inertial acceleration is the rate of change of velocity with respect to time. The force due to gravitational acceleration, on the other hand, does not produce a change in velocity, but it is accompanied by a gradient in acceleration due to the curvature associated with all gravitational fields. (The force of gravity is less at the ceiling than it is at the floor.) The force which is observed is the sum of these forces, greatly complicating the design of the inertial navigation systems employed in aircraft and submarines by requiring that they be able to distinguish between the two effects. The only conclusion that can rigorously be drawn from the Principle of Equivalence is that the gravity transformations must be exactly analogous to the Lorentz Transformations. These transformations are readily derived, as provided below.

8.3- Disillusion sets in, however, when one realizes that the use of the Principle of Equivalence in the generation of General Relativity was based on the observation that inertial and gravitational masses were identical when evaluated in terms of the force produced by acceleration, as expressed by the equation F=M*A, and the force produced by gravitational attraction, as expressed by the

equation $F=GM_1*M_2/L^2$. The most precise determination of the gravitational constant, G, was made by the Eotvos Experiment illustrated in Figure 8.1. In this experiment, three identical metal spheres were used. Two of these spheres were mounted in a dumbbell configuration on a horizontal rod suspended from a fine torsion wire and the resonant frequency of their suspended masses was determined. The third test mass was placed a known distance from one of the suspended masses and the torsional deflection of the suspended masses resulting from the gravitational attraction between the masses was also determined. From these observations it is possible to unequivocally evaluate the gravitational constant, G. So far so good, but then circular reasoning was employed to determine the relationship between gravitational mass and inertial mass using the same equations and, surprise surprise, both types of mass were found to be identical in magnitude. It was then concluded that both types of mass were identical. Of course they were observed to be identical, the difference between them was compensated by the gravitational constant, G. The gravitational mass of an object is actually $G^{0.5}$ times as large as its inertial mass. Disillusionment set in even deeper when the author read in several texts that the solution of the equations which led to General Relativity also provided the value of the gravitational constant. The writers of those texts never realized that the gravitational constant, G, was an input to the theory resulting from the false assumption that inertial and gravitational masses of objects were numerically equal rather than merely proportional to each other.

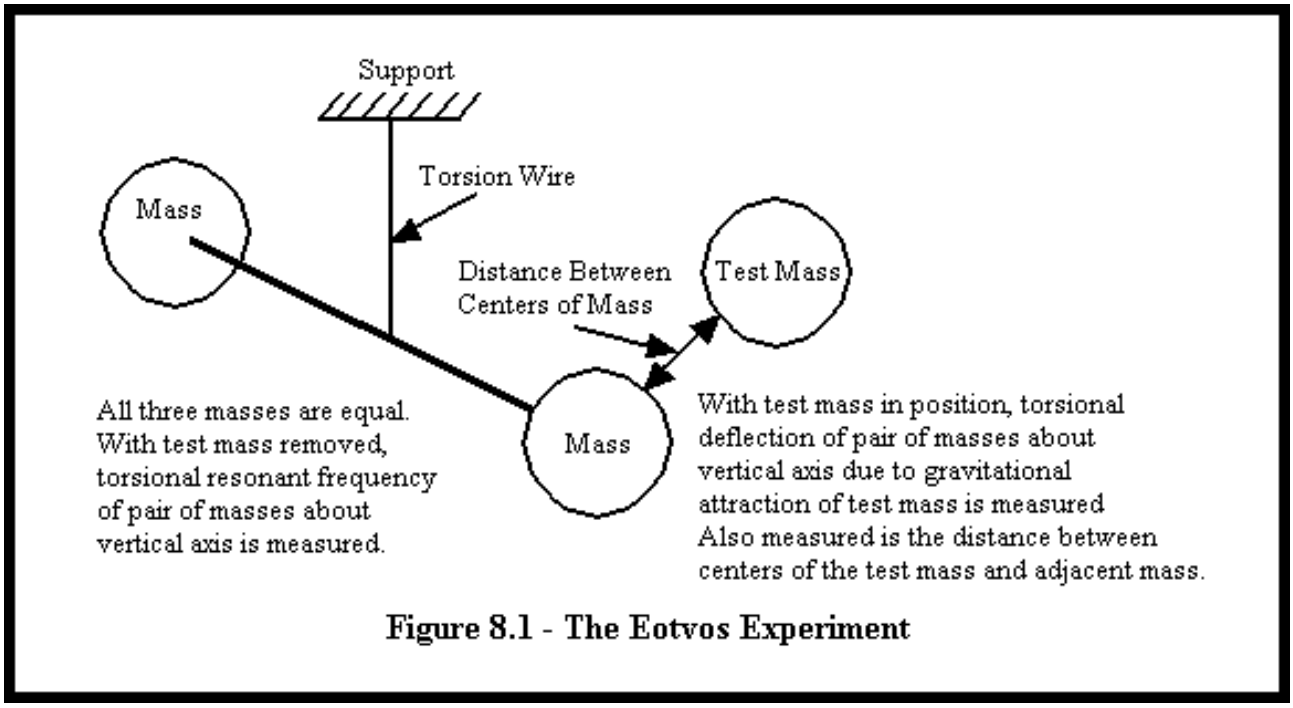


Figure 8.1 - The Eotvos Experiment

8.4- The first step in generating the Gravity Transformations is to define the gravitational equivalent of the velocity ratio, V/C, which is the basis of the Velocity Transformations. That equivalent is the gravitational potential, $, which exists between elevations. Using the upper elevation units of measurement as a reference, $ is equal to the energy, (dE), released as the energy of fall by an object of rest mass equivalent energy, E, as it is lowered from the upper to the lower elevation. [Its value is provided by the relationship $=(dE)/E.] It is demonstrated in "Gravity" that the Gravity Transformations are independent of direction (horizontal or vertical) greatly simplifying their determination since only those resulting from elevation changes need be considered.

8.5- As derived in "Gravity", the gravitational transformation for time, T, is readily determined in terms of the gravitational potential, $, and the Gravitational Transformations for force, F, and for length, L, using the ideal thought experiment illustrated in Figure 8.2. In this thought experiment, mechanical energy is stored in a spring which is then compressed and tied at the upper elevation. The spring is then moved from the upper to the lower elevation and the stored energy is recovered by releasing the spring.Along with this stored energy, the lower elevation also receives the energy

of fall of that stored energy along with the energy of fall of the relaxed spring. The energy of fall of the relaxed spring is then used to return it to the upper elevation and plays no part in the thought experiment. Remaining at the lower elevation is the stored energy and its energy of fall. The net energy transported from the upper to the lower elevation is then converted to photons and transmitted from the lower elevation to a receiver at the upper elevation and converted back to mechanical energy at 100% efficiency. Since there are no losses in this hypothetical closed cycle, the energy recovered from the photons at the upper elevation must equal the energy originally stored in the spring. If this were not the case, it would be possible, in principle, to build a perpetual motion machine which created energy from nothing. In "Gravity", this thought experiment is used to derive the Gravity Transformation for Time as T=1/(1+F*L*$). It should be noted that if the F*L product is arbitrarily made equal to unity, the time dilation provided by General Relativity is obtained.

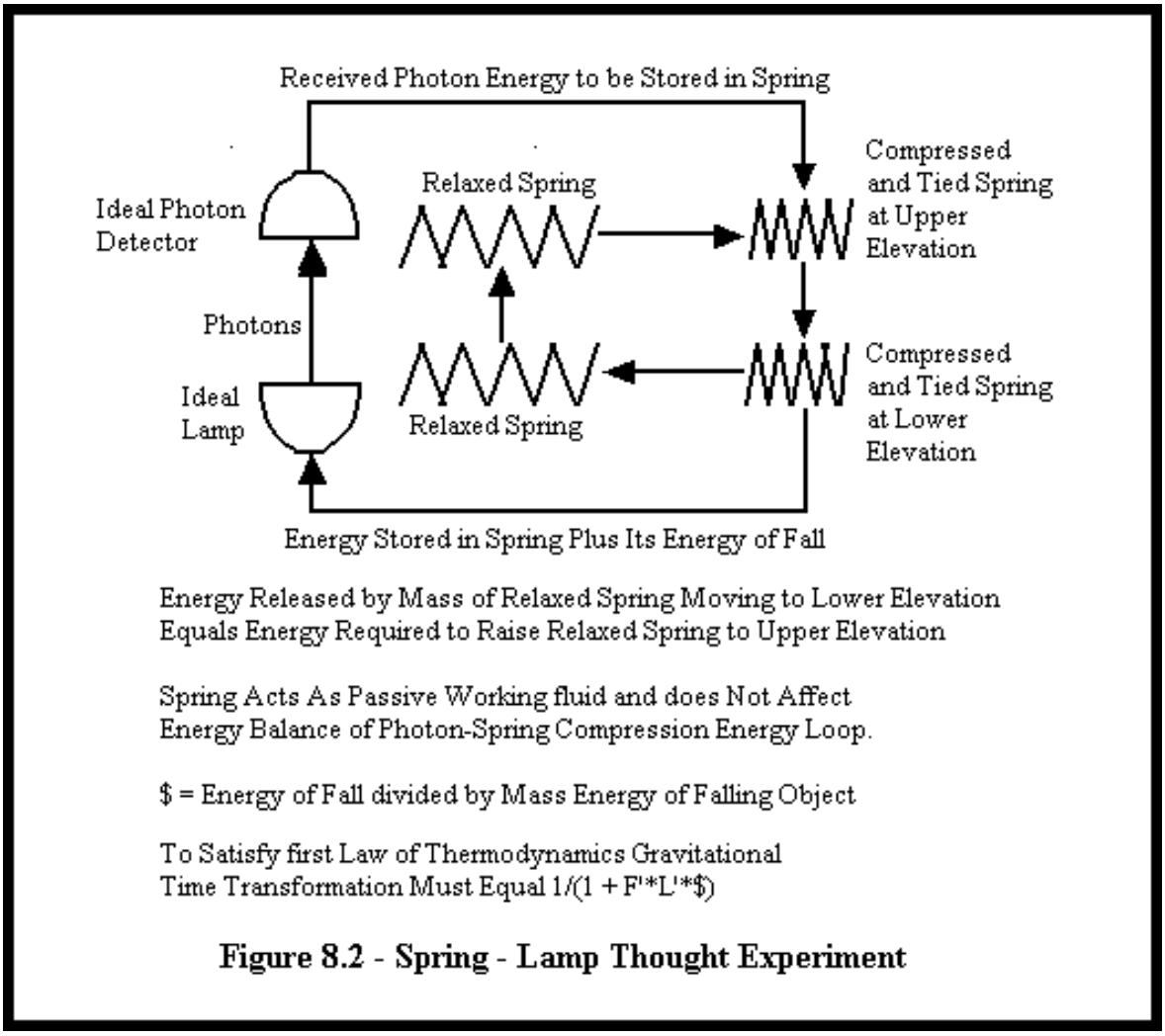


Figure 8.2 - Spring - Lamp Thought Experiment

8.6- The next requirement which must be met is that the Gravity Transformation for Time must have a property which the author designates as multiplicative commutivity. As an example, when one goes from the first floor of a building to its third floor, it does not matter if the elevator happens to stop at the second floor. The requirement that the time dilation be multiplicative commutative means that the time dilation between the upper elevation and a middle elevation multiplied by the time dilation between that middle elevation and the lower elevation must be equal to the time dilation existing between the upper elevation and the lower elevation. Imposing this requirement allows the time transformation of the previous paragraph to be factored into two transformations, one for time, T, and one for energy, F*L, providing T=(1-$) and F*L=1/(1-$). The resulting transformation for energy meets another requirement of a satisfactory gravitational theory. The Gravity Transformation for Energy, F*L, brings the gravitational field into compliance with the Law of Conservation of Energy and, in so doing, eliminates a serious flaw of both the Newtonian Theory

of Gravitation and of General Relativity. The Gravity Transformation for Energy shows that the rest mass equivalent energy of an object, as measured with upper elevation units of measurement, is reduced by an amount equal the energy released by lowering it to the lower elevation. The total energy in the system remains unchanged as required by the Law of Conservation of Energy. The requirement for multiplicative commutivity is not an invention of the author, it is characteristic of all continuous fields. It is taught in undergraduate courses in Field Theory that the difference in characteristics observed between two points in a continuous field is independent of the path which is traveled between those points and, in order for this requirement to be met, the field must be "multiplicatively commutative". Perhaps more significant is the fact that the property of "multiplicative commutivity" is necessary if the Principle of Relativity is to be valid. It is the fact that the Lorentz Transformations are "multiplicatively commutative" which allows the Special theory of Relativity to work.

8.7- At this point, the determination of the Gravitational Transformations could be completed by a literal application of the Principle of Equivalence and asserting that the relationship between the Velocity Transformations for Parallel Length and for Time must bear the same relationship to each other as the Gravity Transformations for Length and Time. One would then conclude that the Gravity Transformation for Force was equal to unity and the Gravity Transformation for Length was 1/(1-$). As shown in "Gravity", the application of this triad of transformations to the gravitational field around the Sun leads directly to the observational results (i.e.- time dilation, anomalous precession of Mercury's orbit, bending of starlight) which supposedly have verified General Relativity. Unfortunately, General Relativity introduced the idea that the presence of mass(energy) causes the geometry of space to be distorted and it was this distortion which produced the gravitational effects. If the presence of mass(energy) does distort space, some or all of the observed bending of light and of the observed orbital precession would result from the curvature resulting from that distortion rather than from the effects of the Gravity Transformations for Length and Time. The introduction of non-Euclidian geometry into the concept of the gravitational field thus allows the possibility of an infinite number of geometries in the vicinity of a gravitating object. The only limitation on these geometries is the requirement that product of the Gravity Transformations for Force and for Length compensate each other so that the Gravity Transformation for Energy remains correct. While General Relativity introduced the idea of curved space, it does not meet this requirement and cannot be a valid description of the gravitational phenomena.

8.8- Since General Relativity has generated a dogma in which space is non-Euclidian, it is necessary to disprove the concept. To do so, consider the ideal thought experiment diagramed in Figure 8.3. In this experiment, a pair of ideal retroreflectors are mounted on opposite sides of a massive object by ideally rigid and massless booms. Photons are reflected back and forth between the retroreflectors in a non-divergent beam which passes close to the object. The object's gravitational field causes the trajectory of the photons to bend as they pass by the object and strike the retroreflectors at an angle to the geometric line between them. Since photons posses inertial mass, the deviation of their path causes a reaction force to be exerted on the retroreflectors as they are reflected. In the horizontal direction (of the diagram), the component of that force on one of the retroreflectors is canceled by an equal and opposite component of that force exerted on the other. In the vertical direction (of the diagram), the force components on the retroreflectors do not cancel, they add and produce a net downward force on the object. This downward force must be balanced by an upward force acting on the object which can only result from the gravitational attraction of the beam of photons. The requirement for a force balance in the vertical direction is basic. If a net force were to exist in the vertical direction, it would be possible, in principle, to construct a perpetual motion machine. This machine would allow the system to continuously export energy without any change in its internally and externally observed states. This is a NO-NO and cannot occur.

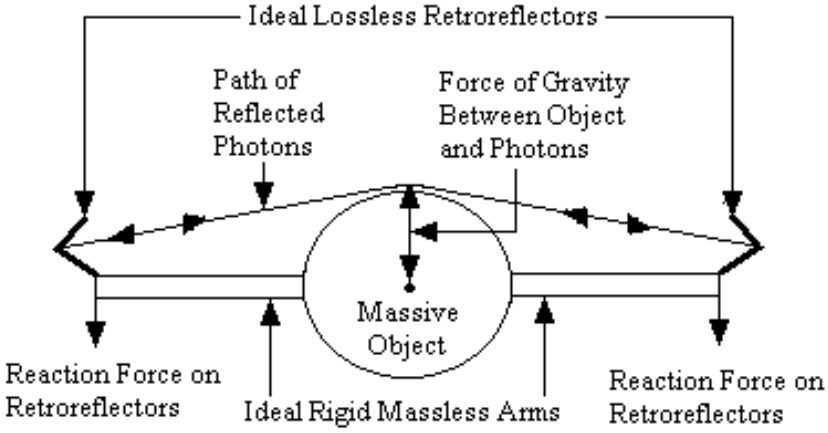


Figure 8.3 - Bending of Light Passing Gravitational Object

8.9- Conceptually, the bending of the path of the beam of photons can result from one or both of two effects acting separately or in combination. One of these effects is conventional refraction. The other effect is the apparent bending of their path because they are traveling in a curved three dimensional non-Euclidian space and they are actually traveling along a straight line. To the degree that the observed bending of their path is caused by refraction, the bending of the path of the photons requires the force of gravity to act between the object and the photons. To the degree that the observed bending of their path is caused by the curvature of non-Euclidian space, no change in direction actually occurs and the force of gravity is not acting. In "Gravity", the writer derived the gravitational force acting upon such a beam of photons and the net forces they apply to the retroreflectors. By showing that these forces are equal, the derivation demonstrates that observed bending of the path of light in a gravitational field results entirely from gravitational attraction. A postulated curvature of space makes no contribution to the photon's path and space in the gravitational field must be three dimensional Euclidian, exactly as common sense would require. It is now possible to provide Gravity Transformations to match the Velocity Transformations already provided. Defining B_v as the velocity transformation, B_g as the Gravity Transformation, and B_{ge} as the gravity transformation of General Relativity, the Relativistic Transformations for Velocity, Gravity, and for General Relativity may be provided in the same form, as shown in Table 8.9.1.

8.10- If the Principle of Equivalence apples to the gravitational field, a proper gravitational theory will provide Gravity Transformations identical in form to the Lorentz Transformations for Parallel Velocity. Gravity Relativity meets this requirement. Its basic transformations are:

F=1
L=1/(1-$)
T=(1-$)

The equivalent transformations for General Relativity are provided for reference. It will be noted that, under General Relativity, both F and L are equal to unity. Applying these values to the results of the Spring-Lamp Experiment of Figure 8.2, one obtains the time dilation, B_{ge}, of General Relativity as its accepted value of T=1/(1+$). The basic transformations of General Relativity become:

F=1
L=1
T'=1/(1+$)

S =1/(1+$)

The above listing includes an additional line for the Gravitational Transformation for Space which Dr. Einstein required to allow him to complete his derivation of General Relativity. It represents the alleged curvature of space made necessary by the mathematical error in its derivation and which arbitrarily forced the transformation for length to equal unity. It will be noted that these transformations are inconsistent with the Velocity Transformations for Parallel Force and for Parallel Length. As a result, General Relativity contradicts one of its postulates, the Principle of Equivalence. Furthermore, because its transformations for force and for length are both equal to unity, the effects of the transformation for time are not compensated between reference frames and General Relativity also contradicts its other basic postulate, the Principle of Relativity. Somehow, it seems reasonable to suspect the validity of a theory which contradicts the postulates upon which it is based.

Table 8.9.1:- The Relativistic Transformations

Quantity	Parallel Velocity	Transverse Velocity	Gravity Relativity	General Relativity
Force F	1	B_v	1	1
Length L	$1/B_v$	1	$1/B_g$	1
Time T	B_v	B_v	B_g	B_{ge}
Space S	1	1	1	B_{ge}
Stiffness K'	B_v	B_v	B_g	1

Note 1:- B_v, B_g, and B_{ge} are all equal to $(c/C)^2$.

Note 2:- Current texts erroneously provide $1/B_v$ as the Lorentz Transformation for Transverse Force.)

8.11- Deriving the General Theory of Relativity presented Dr. Einstein with considerable difficulty. He could not make it work in terms of three dimensional Euclidian space. After about a year and a half of failure, he overcame his difficulties by resorting to the non-Euclidian geometry described by Riemann in the middle of the 19th century and adding the extra degree of freedom that curved space provided. The effect of that curvature is to add additional space as elevation is reduced, as defined by S in Table 8.9.1. This modification allowed him to solve his mathematical equations in a self consistent manner. The resultant theory provided predictions for the behavior of the gravitational field which are more accurate than the predictions of Newtonian Gravitational Theory because they did allow the theory to be relativistic, but the theory contains an error on the order of $\$^2$. That error is about 5 orders of magnitude too small to be detected in the extremely weak gravitational fields existing within the Solar System or by observations of the spectral lines of distant stars. The small size of this error allowed Dr. Einstein to predict the bending of starlight, the time dilation, and the precession of orbits caused by the gravitational field which are now accepted as proof of the validity of General Relativity without fear of contradiction by the results of observation. There is an indication that he suspected that his theory was defective since he is reported to have had concerns about its extension to extremely strong fields such as those associated with neutron stars. Unfortunately, direct observation cannot be used to distinguish between General Relativity and Gravity Relativity. Both approaches yield the same predictions to the foreseeable limits of observational accuracy. The difference between the two approaches can only be observationally determined by close-up observation of objects having extremely strong fields, such as a neutron stars. Such observations probably require the invention of Star Trek's

Warp Drive.

8.12-There is an observational test which can be applied to General Relativity and to Gravity Relativity using current technology. We live in a Universe which approximates a gravitationally collapsed object. At present, its observed radius is several times larger than the radius of the Event Horizon resulting from its estimated mass. However, astronomical observations indicate that the Universe started expanding from its origin as a point source about 15 billion years ago. At its start, the Universe was significantly smaller than its Event Horizon. Apparently, between 3 and 5 billion years ago, the Universe expanded through and is now several times larger than its Event Horizon. Since General Relativity predicts that nothing can escape from within the Event Horizon, the astronomical observations directly deny the validity of General Relativity. Gravity Relativity, on the other hand, is more than merely compatible with astronomical observations, the cosmology which follows from the Gravity Transformations seems to agree quite well with observation.

8.13- As derived in "Gravity", the gravitational potential, $, is equal to R_h/R, where R_h is designated as the Horizon Radius and is equal to the radius of the Event Horizon and R is the actual radius of the object, both as observed externally. Table 8.13.1 provides the Velocity Relativity and Gravity Relativity Transformations of the dimensional entities listed in Table 7.8.1 evaluated in terms of the velocity ratio, V/C, in terms of gravitational potential, $, and in terms of the externally observed ratio of the Horizon Radius to the actual radius, R_h/R.

8.14- A school of thought exists which is associated with the Inflationary Theory of the origin of the Universe. This school teaches that, although the components (stars, galaxies, etc.) of the Universe are observed to be separating at a high velocity, they are actually stationary in space. It is the space that is expanding instead and outside of the Universe there is no space! Such an argument might be acceptable but for two reasons. Firstly, for such to occur, energy would be required to be continuously added to that Universe from some unnamed source. This requirement is evidenced by the fact that, if the matter present in the Universe were to elect to fall back in on itself, it would have further to fall and would release more energy as time passed. This concept suffers from the same difficulty, but in reverse, as does the Universe of the preceding paragraphs. It cannot reconcile the observed Universe with the Law of Conservation of Energy and must be dismissed unless a strong justification can be provided. Secondly, such a Universe would not provide a reciprocal relationship between the gravitational energy and time transformations, and, without that reciprocal relationship, the Principle of Relativity would not apply and physics would change as elevation changed. It would seem that such a concept must be dismissed. The required effects do not seem to occur.

Table 8.13.1:- Dimensional Content of Various Physical Quantities

Quantity	Symbol	Parallel Velocity	Transverse Velocity	Gravity Relativity
Force	F	1	B_v	1
Length	L	$1/B_v$	1	$1/B_g$
Time	T	B_v	B_v	B_g
Energy	E	$1/B_v$	B_v	$1/B_g$
Planck's Constant	H	1	B_v^2	1
Velocity	V	$1/B_v^2$	$1/B_v$	$1/B_g^2$
Acceleration	A	$1/B_v^3$	$1/B_v^2$	$1/B_g^3$

Incremental Mass	**M_i**	**B_v^3**	**B_v^3**	**B_g^3**
Momentum	**U**	**B_v**	**B_v^2**	**B_g^3**
Angular Momentum	**J**	**1**	**B_v^2**	**1**
Gravitational Constant	**G**	**$1/B_v^8$**	**$1/B_v^5$**	**$1/B_g^8$**
Ergo-gravitational Constant	**D**	**1**	**$1/B_v$**	**1**
Temperature	**&**	**$1/B_v$**	**B_v**	**$1/B_g$**
Charge	**Q**	**$1/B_v$**	**B_v**	**$1/B_g$**
Dielectric Constant of Space	**e'**	**1**	**$1/B_v$**	**1**
Permeability of Space	**u'**	**B_v^4**	**$1/B_v^3$**	**B_g^4**
Stiffness	**k'**	**B_v**	**B_v**	**B_g**

Note 1:- $B_v = (1 - V^2/C^2)^{0.5}$

Note 2:- $B_g = (1 - \$)$ or $(1 - R_h/R)$

Note 3:- Velocity Transformations are modified by $(1+V_1*V_2/C^2)$ in the denominator as described in Chapter 6.

8.15- The Source of Gravitational Energy:- When the author was in high school, he asked his physics instructor where the energy was stored when a weight was lifted from the floor to the ceiling. The answer given was that "the energy was stored in the gravitational field". The instructor believed that his answer explained everything when, in reality, it was an admission that the scientific community did not know how or where gravitational energy was stored and it did not have the intellectual integrity to admit that it did not know. ("We don't know" would have been a reasonable answer, but hiding the fact that the answer was unknown is inexcusable.) The author had, and still has, what might be considered to be the unreasonable conviction that the primary purpose of a gravitational theory should be to provide a description of the relationship between elevation and energy which is consistent with the Law of Conservation of Energy. It is the energy of fall, and the force through which that energy is manifested, which is the only first order effect of the gravitational field. The precession of planetary orbits, the time dilations, and the bending of the path of light rays are second order effects which pale into insignificance in comparison. As we have seen, and as rigorously shown in "Gravity", when they are properly applied, the combination of the Principles of Relativity and Equivalence yield a description of the gravitational field which is both consistent with Law of Conservation of Energy and the observed second order effects which are erroneously supposed to have validated General Relativity.

8.16- The gravitational transformations provided in Table 8.13.1 show that the release(absorbtion) of energy as an object changes its elevation results from the release(absorbtion) of a portion of its mass equivalent energy. (Because these transformations are multiplicatively commutative, any elevation may be considered to be the upper elevation, a second elevation closer to the center of the field may be considered to be the lower elevation, and the gravitational potential, $, considered to be defined in terms of the upper elevation units of measurement.) Since the locally measured energy represented by the mass of the falling object is the same at both elevations, as required by the Principle of Relativity, its mass equivalent energy as measured by upper elevation units of measurement, has been reduced by $ at the lower elevation. This reduction in absolute mass equivalent energy equals the energy released by gravitation and the Law of Conservation of Energy

is satisfied. To release this energy of fall, the gravitational field causes the force of gravity to act over the distance of fall.

8.17- Returning to Table 8.13.1, it will be found that the transformation for velocity is $1/(1-\$)^2$. This transformation shows that the velocity of light, which remains unchanged when measured locally, is reduced in the absolute sense at a rate equal to the square of the reduction which occurs in the mass equivalent energy of the falling object. Effectively, the proximity of energy modifies the Aether and produces a local reduction in the velocity of light. (The Aether has already been shown to be the underlying structure of space.) In this sense, the gravitational field is actually a velocity well for light. This velocity well, in turn , allows an object within it to shed some of its internal energy by moving to a lower elevation. It does this by pushing itself downward against the Aether. This push, which we cannot directly observe, is the fictitious force of gravity currently described in texts. We can only observe the equal and opposite reaction to this fictitious force required by Newton's Second Law of Motion (for every action there is an equal and opposite reaction) as the force of gravity. The Gravity Transformation for Energy requires that the falling process cease when, as observed with upper elevation units of measurement, the energy released by falling equals the original energy content of the object. This cessation of falling does in fact occur as the end state of gravitational contraction and will be discussed in detail later.

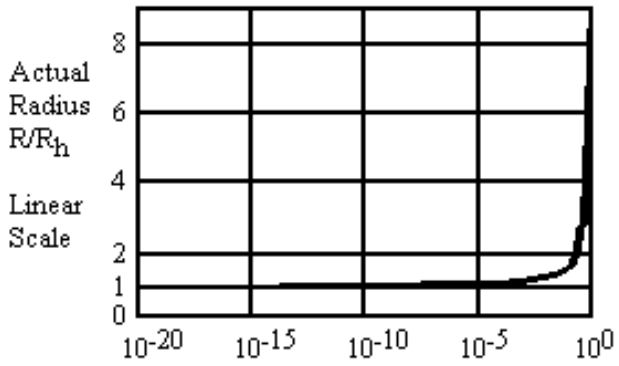
8.18- The reduction of the velocity of light in a gravitational field not only produces the force of gravity by allowing energy contained within an object to be released, it refracts the path of a ray of light (and all radiation) passing through the field in the same manner as the slowing of light in a lens refracts its path and allows your eyes to focus on this sentence. When a photon is in a gravitational field, it experiences the same impulse to release its energy as does matter. However, unlike a material object, a photon cannot transform its energy into kinetic energy as its elevation is lowered because it must always travel at the local velocity of light. As observed with upper elevation units of measurement, the energy (frequency) of that photon remains unchanged. As observed at the lower elevation, where the units of measurement for time are larger and the units of measurement for energy are smaller, its frequency and energy have increased. Gravitational refraction of the path of light is accompanied by a gravitational force of attraction. As derived in "Gravity", the gravitational force acting on photon is twice the gravitational force acting on a material particles of the same energy. What does not seem to have been recognized is that the gravitational attraction of the photons (and neutrinos) associated with the background radiation level of space can easily represent the dark matter currently sought by astronomers and cosmologist.

8.19- <u>The Effect of the Gravitational Field on the Velocity of Light</u>:- From the time that Special Relativity was published until the early 1980's, it was accepted as an absolute truth that the velocity of light in a vacuum was a constant that was unchanged by any change in velocity or elevation reference frame. Along with this viewpoint was the idea that a straight line was defined by the path of ray of light between two points. The author was rather startled to read in a book entitled "Was Einstein Right?" by Dr. Will that the velocity of light was no longer considered to be unchanged in a gravitational field, but was reduced in proportion to that theory's time dilation. Even more startling was the fact that the change in viewpoint was made by the academic community without the slightest embarrassment even though its change undermined the philosophical foundations of both Special and General Relativity.

8.20- The correct effect of changes in elevation on the velocity of light is provided by the Gravity Transformation for Velocity in Table 8.13.1 as a function of the ratio between the distance, R, to the center of a gravitationally attracting object and its Horizon Radius, R_h, both as measured with the units of measurement existing at an infinite radius. The departure of the velocity of light from its nominal value of C when R approaches R_h is provided in Figure 8.4. It will be noted that, because of the minus sign in the transformation, as the radius approaches the Horizon Radius, the velocity of light abruptly approaches zero. The effect of this drop in the velocity of light causes the path of a ray of light to be refracted by the gravitational field for the same reason that the lenses in your eye

refract the light to bring the image of this text to a focus on the retina of your eye. The velocity of light is slowed down by the nature of the space through which the light is passing. This change in the velocity of light is concealed from a local observer who, of necessity, measures the velocity of light with units of measurement which have been altered by the gravitational field.

8.21- If one could observe, from a distance, an object which has collapsed to less than twice its Horizon Radius, he would find that the effects of refraction causes it to appear to have a radius of 6.75 times the Horizon Radius. This occurs because the line of sight from the observer to the surface of the object is refracted towards the object and causes it to appear larger than it actually is. The effect is shown in Figure 8.5. A hypothetical observer on the surface of the object would find that the angle between the zenith and the horizon became smaller than 90 degrees as the object contracted to a radius smaller than twice the Horizon Radius and became equal to zero when the object had contracted to the Horizon Radius. The possible paths of rays of light leaving the surface of a collapsed object are illustrated in Figure 8.6. Surprisingly, gravitational refraction has no effect on the ability of the object to radiate energy to space. As the object contracts, the approach of the horizon towards the zenith reduces the solid angle from which radiation can escape from its surface to space, but the effect is exactly counterbalanced by the fact that the surface from which the radiation is effectively emitted to space has the optical size of 6.75 times the Horizon Radius. In terms of the ability of the object to radiate energy to space, refraction may be ignored.



Note:- Actual Radius and Velocity Measured with Units of Measurement Which Exist at an Infinite Radius. As Measured with Local Units of Measurement (Existing at Radius R). Light Travels at Nominal Velocity of C.

Figure 8.4 - Velocity of Light Reduction in Region of Horizon Radius

8.22- As shown in "Gravity", the slowing of light in a gravitational field not only refracts the path of light, it refracts the paths of moving objects. This refraction of path is in addition to the orbital effects of gravitational attraction and is responsible for the anomalous precession of planetary orbits which supposedly prove the validity of General Relativity. The basic Law of Motion of Newtonian Physics which states that "an object having a velocity will retain that velocity unless it is acted upon by an outside force" is still true, however, the velocity which obeys this law is the velocity of the object as measured in terms of the locally observed velocity of light.

8.23- Experiments have been proposed, and may already have been performed, to provide additional verification of General Relativity. These experiments consist of placing extremely accurate gyroscopes in orbit and observing the precession of their axes as a result of their orbital

velocity. Such experiments will indeed verify that gravity is a relativistic phenomena since the relativistic gyroscopic effects which will be observed are a direct consequence of the gravitational refraction of the velocity vector. They will not show that General Relativity is the correct relativistic gravitational theory.

8.24- ***Gravity results from the fact that the velocity of light is slowed by the proximity of energy. This slowing of the velocity of light results in the changes in the size of the units of measurement illustrated in Table 7.2.1, Table 7.8.1, Table 8.9.1, and Table 8.13.1*****.**

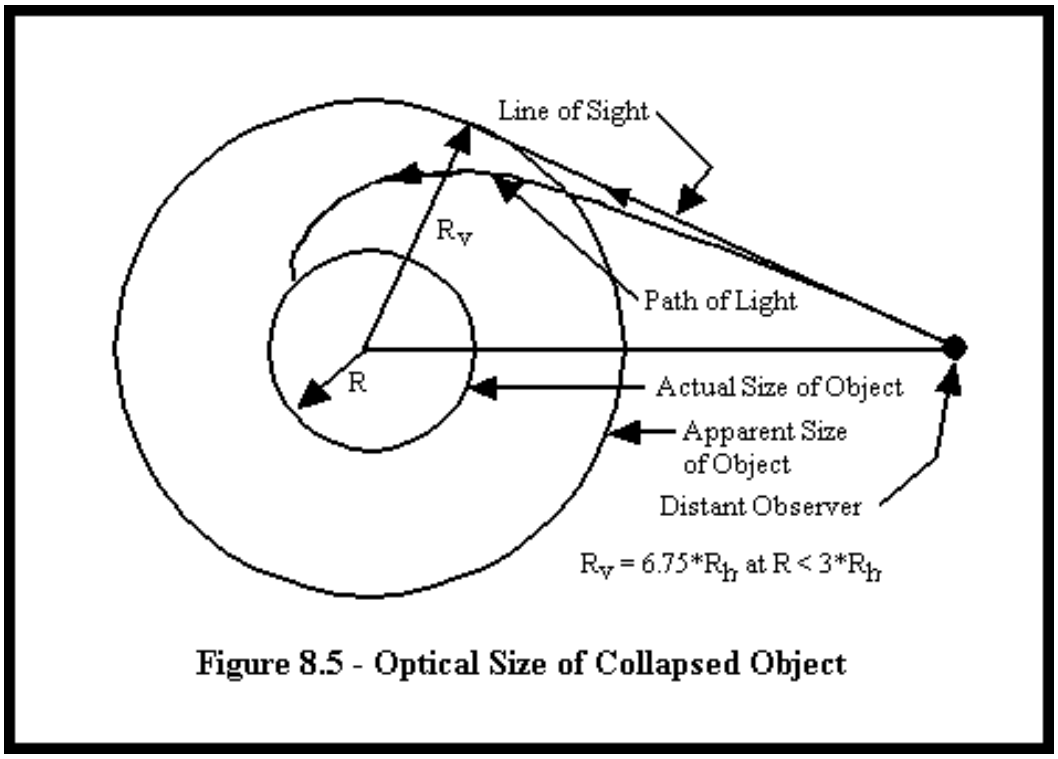


Figure 8.5 - Optical Size of Collapsed Object

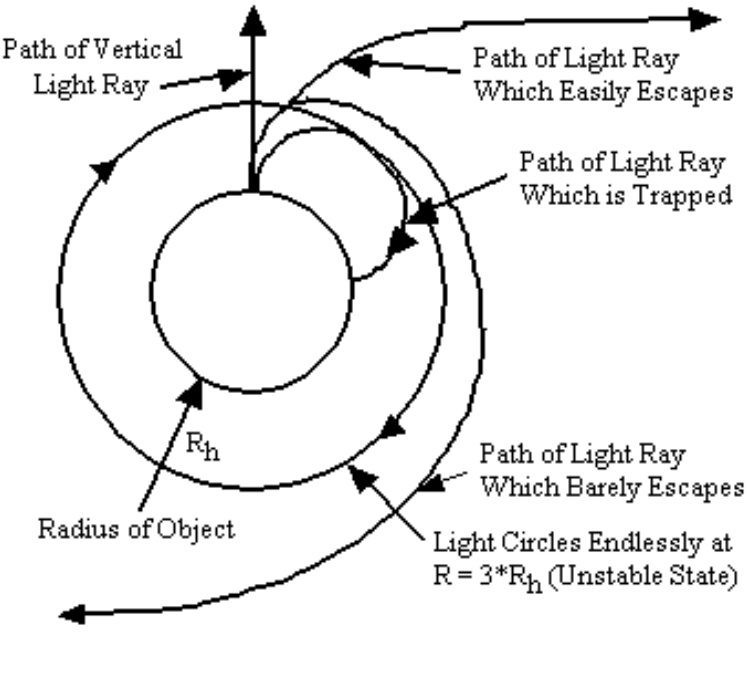


Figure 8.6 - Path of Light Rays Leaving Collapsed Object

Chapter 9 - Dr. Einstein's Error and the Introduction of Curved Space

9.1- Where did Dr. Einstein go wrong? - Since the General Theory of Relativity yields results which are in conflict with the postulates upon which it is based, it is apparent that at least one significant mathematical error was made in its derivation. In order for the existence and nature of that error not to have been recognized by Dr. Einstein and his contemporaries, it must be of a type which would not be obvious to individuals of sufficient stature and scientific sophistication to be in a position to question his work. It is likely that the error was recognized from time to time by bright undergraduates, but their objections would not be accepted by an academic priesthood dedicated to preserving the true faith. Questions from such sources would be brushed aside because obviously they could only have resulted from a lack of understanding on the part of questioners who were not sufficiently trained (brainwashed?) to understand the subject matter and who did not as yet possess the proper 'yup's.

9.2- In deriving the General Theory of Relativity, Dr. Einstein employed a mathematical tool called Tensor Calculus. Properly applied, this tool is extremely useful and normally insures that the effects of all possible variables are considered. It does have a limitation however, it cannot be used for deriving a relativistic theory. Tensor Calculus, in its simplest form, is a process in which partial derivatives of the variables of interest are arranged in a set of simultaneous equations similar to those encountered in conventional algebra. A typical group of Tensor Calculus equations is illustrated below:

$$A_{11}*(dX)+A_{12}*(dY)+A_{13}*(dZ)=W_1$$
$$A_{21}*(dX)+A_{22}*(dY)+A_{23}*(dZ)=W_2$$

A_{31}*(dX)+A_{32}*(dY)+A_{33}*(dZ)=W_3

9.3- In this group of equations, the symbols A_{11} through A_{33} are constants determined by the problem, the symbols X, Y, and Z are the variables whose value is to be determined, W_1, W_2, and W_3 are the sums of each of the equations, and the symbol d within parenthesis indicates that the term is a partial derivative. Solution of equations of this type requires a mathematical procedure known as integration. Therein lies the rub. To perform that integration, it is necessary to know that the coefficients (eg:- A_{11} through A_{33}) of the partial derivatives are independent of the variables. To understand why, consider the use of the rules of Elementary Calculus to integrate the expression K*(dX). If K is independent of the value of X, the result of the integration is K*X+C", where C" is the constant of integration. However, if K is equal to X, the result is $X^2/2$+C", an entirely different result. A basic rule of all types of Calculus, including Tensor Calculus, is that the variable to be integrated must be completely defined in the expression itself and not be hidden within other terms, in this case, K.

9.4- It is because the solution of a problem in Tensor Calculus requires the performance of mathematical integration that Tensor Calculus is unsuitable for the derivation of a relativistic theory. The partial derivatives in the Tensor Calculus matrix used to derive the General Theory of Relativity involve length. It has been demonstrated that the units of measurement of length change between reference frames which differ in velocity. Since the derivation of General Relativity is based upon the Principle of Equivalence, it follows that the effect of a change in elevation on the units of measurement for length must be known in order for a meaningful, mathematically valid, integration to be performed. (The size of the units of measurement are analogous to the "size" of K in the previous paragraph.) Unfortunately, the effect of a change in elevation on the units of measurement for length cannot be known until the integration has been performed correctly and a valid integration cannot be performed until the effects of a change in elevation on the units of measurement for length are known. Consequently a valid derivation of gravitational theory is not possible by this method. When the attempt is made, it arbitrarily forces the Gravity Transformation for Length to equal unity regardless of its correct value. Until the Tensor Calculus equations have been solved, the required information needed to solve them is not available. It is difficult to understand, however, why Dr. Einstein did not recognize that, in employing Tensor Calculus to derive General Relativity, he was incorporating an erroneous loop of circular reasoning. *If an undergraduate student of elementary calculus persistently made an equivalent error he would receive a failing grade for the course.*

9.5- Dr. Einstein's mathematical error made it impossible to achieve a solution of the General Relativity Tensor in a manner which is consistent with Euclidian geometry. He is reported to have struggled with this difficulty for about 18 months and finally resolved his impasse' by adding another, otherwise superfluous, degree of freedom. He did this by incorporating the curved space described by Riemann Geometry. This addition permitted the mathematical equations to be solved, but the results were clearly not rigorously correct since, as Table 8.9.1 shows, the resultant General Theory of Relativity clearly violates the Principles of Relativity and Equivalence upon which it is based. Unfortunately, the fact that gravity is a relativistic phenomena insured that General Relativity contained enough truth to enable it to gain acceptance by refining the predictions of Newtonian Gravitational Theory to agree with the observed anomalous precession of Mercury's orbit, the observed red shift of Solar spectral lines, and the bending of the path of starlight by the Sun's gravitational field to within the limits of observational error.

9.6- During the Solar eclipse of 1919 when the bending of the path of starlight by the Sun's gravitational field predicted by General Relativity was verified, Dr. Einstein's confidence in the outcome surprised many of his contemporaries. In expressing this confidence, he was on safe ground. He knew that gravitation was a relativistic phenomena and that it didn't matter whether General Relativity was rigorous. The fact that General Relativity made its predictions based upon relativistic effects insured that any residual error would be about a million times too small to be

revealed in the Sun's puny gravitational field. There is a suggestion that Dr. Einstein recognized that General Relativity was not rigorous since he is reported to have expressed misgivings as to its application to the strong fields such as exist around neutron stars. The question that can never be answered is whether Dr. Einstein believed that the curved space solution of General Relativity was valid, or whether he engaged in scientific fakery with the confidence that it could not be unmasked. One must remember the comment made in a meeting in which General Relativity was evaluated, "why shouldn't we consider space to be curved, nobody can prove that it isn't". The author finds it difficult to differentiate Dr. Einstein's use of curved space to allow him to complete his derivation of General Relativity from the actions of a mechanic who installs the wrong part into a machine by hammering it into place.

9.7- The Meaning of Curved Space:-The most significant property of the gravitational field is not revealed in the effects represented by the precession of orbits, the time dilation, or the bending of the path of a ray of light as it passes the Sun. These are second order effects. The only first order effect of the gravitational field is typified by the force which holds you to your chair as you read this sentence and the energy of fall which you will experience if you fall from the chair. This force, and the energy of fall it implies, is the primary reality of the gravitational field. There is no way in (expletive deleted) that a curvature of space can account for that force and that energy without the presence of an attractive gravitational force. It is irresponsible to assert, as proponents of General Relativity must, that "the apparent ability of the gravitational field to create energy from nothingness does not constitute a violation of the Law of Conservation of Energy because the energy which is created cannot climb out of the field". Any proper gravitational theory must explain the reason for the force which holds you to your chair and the source of the energy which is released when you fall in a manner which is consistent with the requirement that energy be conserved. The author was once reminded by a physicist that some texts assert that General Relativity has eliminated gravity as a force. For some reason that physicist became strangely silent when it was suggested that he step through an adjacent second story window so that we could discuss the subject across the window sill.

9.8- Under Newtonian Theory, gravity is an attractive force acting between two concentrations of energy (masses), E_1 and E_2, in inverse proportion to the square of their separation, R, in accordance with $F=D*E_1*E_2/R^2$. The theory makes no attempt to explain the source of that force and the energy it represents. Since it is a descriptive law derived several centuries before the Law of Conservation of Energy was recognized, there is no need for it to apologize for that omission unless, of course, one intends to retain it as the theory which represents reality. Its conclusion that the force of attraction between objects varies inversely with the square of their separation reasonably follows from the fact that the area of a spherical surface varies as the square its radius. General Relativity, on the other hand, does not have the luxury of ignoring the source of gravitational force and gravitational energy since it claims to represent reality and was derived at a time when the Law of Conservation of Energy was well established.

9.9- At first glance, the non-Euclidian geometry of Riemann which was used by Dr. Einstein in formulating General Relativity appears sophisticated. When one examines Dr. Riemann's geometry in detail, he finds that it is a subset of conventional Euclidian geometry in which a non-Euclidian geometry of three spatial dimensions is used to describe the properties of a "surface" which can be considered to be contained in a Euclidian geometry of four spatial dimensions. As the author pointed out in "Gravity", any non-Euclidian geometry of N spatial dimensions can be contained in a Euclidian Geometry of N+1 spatial dimensions. (An example of non-Euclidian geometry as a subset of Euclidian Geometry is the two dimensional non-Euclidian geometry which describes the surface of our three dimensional Euclidian Earth).

9.10- For a reasonable and conscientious man to accept the concept that gravity results from the distortion of our familiar three dimensional Euclidian space into a four dimensional non-Euclidian space, he must be provided with a reasonable description of the nature of that distortion as it appears in the four dimensional Euclidian space. The closest approach to such a description seems

to be speculation as to whether our three dimensional space is positively curved, as is a sphere, or whether it is negatively curved, as is a saddle. It is commonly asserted that if our observable three dimensional space is positively curved, it encloses a four dimensional space of finite volume, while if its curvature is negative, the volume of the four dimensional space enclosed is infinite. Actually, a common sense understanding of the concept easily reveals that there is no connection between whether the four dimensional space is enclosed by the three dimensional surface and therefore has a finite volume and whether the curvature of the three dimensional space is positive or negative. As an example, the two dimensional non-Euclidian surface analogous to the reflector of an automobile headlight is positively curved but the volume of the three dimensional space it encloses is infinite. On the other hand, the two dimensional non-Euclidian surface represented by the inner portion of an automobile inner tube is negatively curved, but it encloses a finite volume. The factor which determines whether the geometry of the surface contains an infinite or a finite volume is determined not by the polarity of its curvature but by whether the curvature along each of its axes is greater or less than the curvature of a parabola. For some unexplained reason these same mathematical physicists assume that whether or not our Universe reverses its expansion and collapses in upon itself to produce a cosmic crunch is determined by whether space is positively or negatively curved. The word 'assume' provides valuable advice. Divided into syllables, it is a reminder that when you ass*u*me, you run the risk of making an 'ass' of 'you' and 'me'.

9.11- In terms of Newtonian Theory, gravity is a rather straightforward phenomena. As Figure 9.1 illustrates, an object suspended above a central gravitational mass and having no orbital velocity experiences a force impelling it towards that mass. This is the force you feel applied to the seat of your pants as you sit in your chair. Under General Relativity, as illustrated in Figure 9.2, an object suspended above a central gravitational mass and having no orbital velocity experiences the same attractive force. However, that force is of enormous magnitude, is inversely proportional to the size of the central mass, and acts in a direction at right angles to our observable three spatial dimensions. The force holding you to your chair is the component of that enormous attractive force which is observable in our three dimensional space as a result of its distortion into the fourth spatial axis. Under General Relativity, the actual gravitational force which produces the observable force component holding you to your chair is on the order of 2^{18} tons. Under both Newtonian Theory and General Relativity, gravity is an attractive force acting at a distance. The difference between the two concepts is that, under Newtonian Theory, gravity is an attractive force acting towards the central mass responsible for the field, while General Relativity asserts that the presence of a central mass creates an enormous attractive force aligned with an unobservable fourth spatial axis and simultaneously distorts our familiar three dimensional flat space towards that axis to allow a component of that enormous force to appear as the force of gravity. General Relativity does not eliminate gravity as a force, it converts it into an incredibly large force acting along an unobservable fourth spatial axis towards a source which does not seem to have a physical existence and which produces infinite energy from nothingness. Come on fellows, give us a break.

9.12- The only reason for considering that space is curved by the presence of mass into a fourth spatial axis and the existence of that enormous attractive force acting along that axis is that mathematical error made by Dr. Einstein in deriving General Relativity. The concept of curved space has survived because of the effectiveness of the defenders of the faith in suppressing the questioning by heretics who would dare to challenge the revealed truth. Lately, however, there seems to some hedging on the question of whether space is curved among senior members of the academic community. For example, in a recently published book, a respected authority in the field (who had received a copy of "Gravity" in 1988) states that there is no difference in the results obtained when one considers space to be curved by the gravitational field and when one considers lengths to shrink as elevation is lowered.. (Needless to say, the author takes issue with that assertion.) Remember, as mentioned earlier, it has been demonstrated in "Gravity" that, if space is curved, it is possible, in principle, to build a perpetual motion machine of the first kind. That machine would be capable of exporting energy forever without any change in its internally or externally observed states. Again, if any reader believes that such a machine is possible, there is a bridge that the author has been trying to sell.

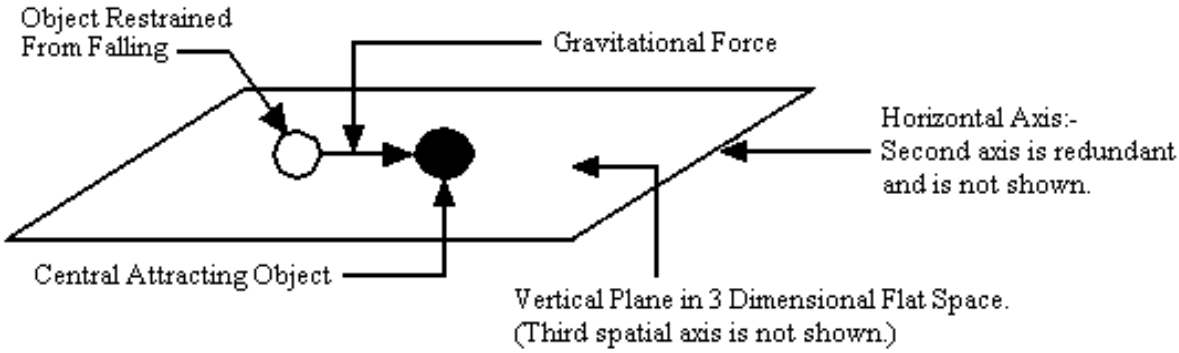


Figure 9.1 - Gravitational Attraction in "Flat" Space

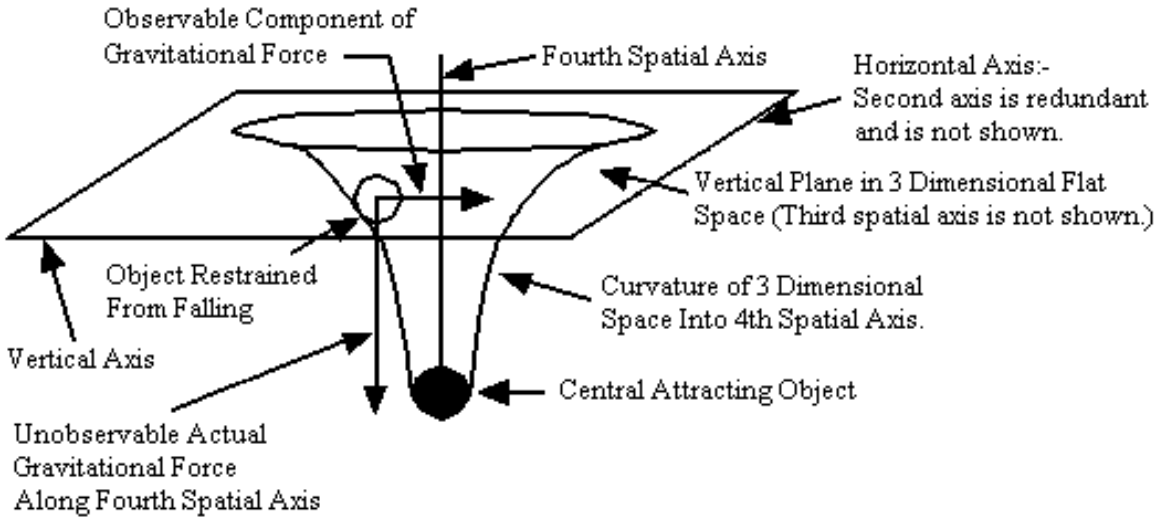


Figure 9.2 - Gravitational Attraction Under Curved Space Concept

9.13- The author's contention in "Gravity" (1988) that any non-Euclidian geometry of N dimensions can be contained in a Euclidian geometry of N+1 dimensions or higher seems to have been acceptable to the academic community since it has subsequently appeared in books written by at least two individuals who have received copies of that text, although one of these individuals asserted that a Euclidian geometry of N+3 dimensions was required. It is desireable, therefore, to re-examine the geometry of Riemann.

- **The primary difference between the axioms of Riemann geometry and Euclidian geometry is that Riemann's geometry does not require that parallel lines never meet while Euclidian geometry does have that requirement. The writer understands that both geometries define a straight line as the shortest distance between two points.**
- **Since the non-Euclidian geometry of N dimensions can be contained within a Euclidian geometry of N+1 (or N+3) dimensions, the shortest distance between two points does not lie within the non-Euclidian geometry. It leaves that geometry between the two points and travels through the Euclidian geometry of N+1 (or N+3) dimensions. (To illustrate, if one considers the surface of the Earth to represent a two dimensional non-Euclidean geometry, the shortest**

distance between New York and Los Angleses is not a great circle, it is through a tunnel which passes almost two hundred miles beneath the Mississippi River.)

- **The straight line of non-Euclidan geometry is the shortest distance between two points which remains within the non-Euclidian geometry (e.g.- the great circle path between New York and Los Angeles.) Since the straight line of non-Euclidian geometry does not meet the rigorous definition of a straight line, it seems reasonable to question the rigor of non-Euclidean geometry except as a convenient means of describing the properties of a curved "surface" contained within a "volume" defined by Euclidian geometry.**

- ***The author asserts that a rigorous theory should not be based upon Riemannian geometry without an adequate and relavent treatment of the higher order Euclidian geometry it implies.***

9.15- The idea that a Euclidian geometry of at least six spatial dimensions (N+3) was required to contain a three dimensional non-Euclidian geometry is supported by the assertion that each plane in a three dimensional non-Euclidean space, (X-Y), (X-Z), and (Y-Z), requires a separate degree of freedom in the higher order space. The requirement for the additional dimensions (N+3) would be reasonable if one considered the three planes to be independent. However, these planes are not independent, they are interlocked into the three dimensional non-Euclidean space as a unit. Consider three dimensional Euclidean space to be composed of a series of $(X\text{-}Y)_i$ planes, $(X\text{-}Z)_j$ planes and $(Y\text{-}Z)_k$ planes (where i, j, and k are integers between one and infinity. These planes meet at vertices "ijk". If the three dimensional Euclidean space is curved into a non-Euclidean space about any or all of its principle axes, the vertices of the planes must remain coincident, point "ijk" must remain point "ijk". As a result, it seems reasonable to conclude that only one extra degree of freedom is required and the three dimensional non-Euclidean geometry may be validly considered as a hyperplane contained in a four dimensional Euclidean geometry.

9.16- Whether the writer's assertion that a Euclidian space of (N+1) dimensions is adequate to contain a three dimesional non-Euclidian space correct is unimportant. It is rigorously shown in "Gravity" that our universe is a three dimensional Euclidian space. The curvature of that space that is currently accepted as representing reality results from Dr. Einstein's attempt to overcome the error introduced by his misuse of Tensor Calculus in the derivation of General Relativity.

Chapter 10 - Gravitational Contraction and Collapse

10.1- The Formation of a Gravitational Object:- Common experience reveals that an accumulation of matter creates a gravitational field which attempts to compact that matter into a mathematical point. We experience that field as a force which impels us towards the center of the Earth and would fall to that center if it were not for the material of which the Earth is composed. Each layer of that material is attracted towards the center and is supported by increased pressure in the underlying layers until the pressure maximum is reached at the Earth's center.

10.2- For an object the size of the Earth, normal matter is able to withstand the gravitationally induced pressure and nothing dramatic occurs. For larger objects, gravitational compression is more complicated. Typically, such objects have the same composition as the interstellar gases (99% hydrogen and helium) from which they were formed. As the object contracts, its gases are compressed and the temperature at its center increases due to the temperature rise of adiabatic compression. (Adiabatic temperature rise is the phenomena which causes the temperature of the Earth's atmosphere to decreases with increasing altitude and causes the surface of Venus to be hot enough to melt lead.) If the mass of such an object is more than 10 times that of Jupiter, adiabatic temperature rise and gravitationally induced pressure cause the temperature and pressure at its

center to reach a level where hydrogen fuses to form helium. This fusion releases large amounts of energy and raises the temperature, and therefore the gaseous pressure, at the core to the point where it is capable of resisting gravitational pressure and the contraction stops. The object has then become a star in which fusion energy released at the core produces the temperature needed to allow gaseous pressure to balance gravitational pressure. Simultaneously, energy flows from the hot core to its surface, is radiated to space, and must be replaced by the fusion of more hydrogen.

10.3- Eventually, enough hydrogen has fused to helium to make the hydrogen burning process ineffective and the core contracts to release gravitational energy to replace the energy flow no longer provided by hydrogen burning. Core contraction continues until a temperature and pressure is reached where helium can fuse into still heavier elements and again supply the energy flow needed to resist gravitational pressure. This stage in a star's evolution is dramatic. The switch from hydrogen burning to helium burning requires a large increase in the temperature of the core and produces a correspondingly large increase in the rate of heat flow to the surface. To radiate that larger rate of heat flow, the star requires a much larger surface area and it expands to become a red giant. (In about five billion years, our Sun will reach this stage and its surface will encompass the orbit of Mars.) When the helium fuel is exhausted, the successively heavier elements which are the ashes of the lighter elements already burned are themselves burned into even heavier elements. Their burning, however, does not induce a significant increase of core temperature and burning rate and the star contracts from its red giant state to approximately its original size. The generation of energy in the core by the fusion of progressively heavier elements ceases when the core has been burned to iron because the formation of elements heavier than iron absorbs energy instead of releasing it. The future of the star from this point on depends upon its mass.

10.4- If the star is smaller than about 1.4 solar masses, the matter in its core is capable of resisting the pressure exerted by the overlying material and it eventually cools to the temperature of space. If the star is larger, normal matter in the core is not capable of resisting gravitational pressure and atomic electrons are squeezed into the atomic nuclei to form neutrons. Since neutrons do not repel each other, the core collapses almost instantaneously from the density of compressed atoms to the density of neutrons. This collapse produces a shock wave which raises a significant portion of the hydrogen overburden to fusion conditions and the star explodes. If the star is smaller than about 3 solar masses, the gaseous overburden is not able to contain the explosion and a supernova results. The remnants of such an explosion are a neutron star at the center of an expanding shell of gas. If the star is between 3 and 4.5 solar masses, the overburden is sufficient to limit the explosion and the object sheds a portion of its gaseous envelope. That explosion, known as a nova, is much less severe, and may occur several times as the star reduces its mass to the point where its neutron core can support the overburden of stellar gasses.

10.5- Gravitational collapse occurs when the size of the collapsing star exceeds 4.5 solar masses. Such stars are not capable of reducing their mass by exploding. The gaseous overburden is too great and a collapse of the star which results from the inability of the neutrons in its core to resist gravitational pressure goes to completion. Under both Newtonian Gravitational Theory and General Relativity, such an object has no choice but to collapse almost instantaneously to a mathematical point called a Singularity. (Recently a suggestion was made that electrons will collapse to form kaons under sufficient pressure. Even though kaons, like photons and neutrinos, compress rather than collapse under pressure, the mathematics associated with both theories show that kaons are not capable of preventing the final gravitational collapse.)

10.6- The fact that both Newtonian Gravitational Theory and General Relativity predict that large objects eventually contract to a mathematical point at a velocity greater than the velocity of light to form Black Holes, Singularities and Wormholes should have led to the conclusion that the theories were defective and/or incomplete. Unfortunately, in this area at least, science has been converted into a religion. As a result, physicists are prevented from raising embarrassing questions either because of the lemming effect characteristic of all religions or because challenging the true faith would end their careers. Since the author is neither a lemming nor is he dependent upon the

goodwill of the defenders of the true faith, he is free to challenge that faith and assert that a proper gravitational theory must yield the following results:

- **It will predict the cessation of contraction at the radius where the velocity of fall from an infinite distance is equal to the velocity of light.**
- **It will be consistent, in the absolute sense, with the Law of Conservation of Energy.**
- **It will be consistent with the Principle of Relativity.**
- **It will be consistent with the Principle of Equivalence.**
- **It will yield predictions which are consistent with observation.**

Of the above, General Relativity only satisfies only the last requirement and that satisfaction is superficial. Gravity Relativity, on the other hand, meets all of the requirements.

10.7- Modeling the Gravitational Object:- In "Gravity", the author has examined gravitational collapse by assuming a highly artificial model of the gravitational field to allow its inherent characteristics to be examined while retaining sufficient simplicity to allow easy solution. This model is diagramed in Figure 10.1. The assumptions which were made are tabulated below:

- **The mass of the object is contained in an infinitesimally thin shell which is at a constant radius from the center. All of its gravitational mass and its entire internal volume is at the same gravitational potential.**
    - **This model is structurally unstable and will collapse in response to the slightest deformation, just as a plastic soft drink bottle will collapse under a slight external pressure even though it can withstand considerable internal pressure. This instability does not limit its usefulness in analyzing the gravitational field.**
- **Where it is necessary in the discussion to eliminate the effects of energy loss by radiation, the surface of the object is considered to have zero emissivity.**

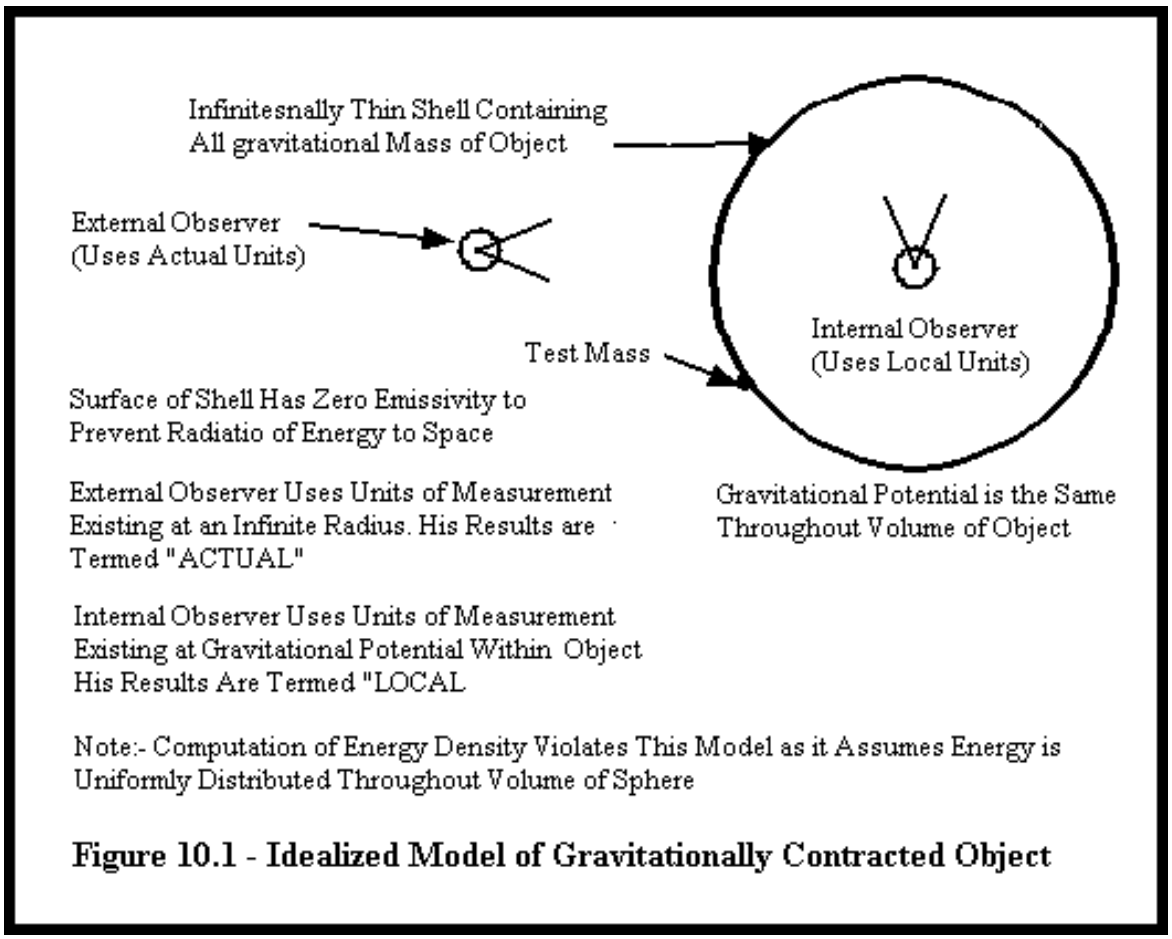


Figure 10.1 - Idealized Model of Gravitationally Contracted Object

10.8- These simplifications allow the object to be treated as if it had a single radius, R, instead of requiring it to be an infinite series of nested shells of decreasing radii which are at an increasing gravitational potential, density, temperature and pressure as the center of the object is approached. The simplified model does not accurately represent the interior conditions of a gravitationally contracted object, but it is rigorous outside of the object. While conclusions based upon such a model will quantitatively differ from what actually occurs, they will be a reasonable approximation. In "Gravity", this model is solved for the two end limit cases. One case results when none of the energy released by gravitation is radiated to space. The other results when all of the energy released by gravitation is radiated to space. (Actual gravitational contraction follows a path between these end limit cases and is determined by the portion of the initial total energy which has been radiated to space.) To provide clarity to the discussion, observations made with the units of measurement existing at a quasi-infinite distance from the object are described as "actual" or "actually observed". Similarly, observations made with the units of measurements existing near or within the object are described as "local" or "locally observed". It must be reiterated that the "actual" units of measurement remain unchanged as a result of a change of elevation while the "local" units of measurement change in a manner which satisfies the Principle of Relativity both within and between elevations, as provided by the Gravity Transformations of Table 8.13.1.

10.9- In "Gravity" it is shown that the gravitational potential, $, may be determined from the actual radius, R and the Horizon Radius (designated as the Schwarzchild Radius in "Gravity"), R_h, using the expression $\$=R_h/R$. (To provide a reference for the reader, the Horizon Radius for an object the mass of the Sun is about 1.38 kilometers.) Substituting this expression into the gravitational transformation (1-$) provides the basic gravitational transformation as also being equal to $(R-R_h)/R$. The Horizon Radius is determined, in turn, by the total energy content, E_t, of the gravitating object, the Ergo-gravitational Constant, D, and the portion, #, (the range of # is 0 to 1) of the total energy content which is in the form of radiation. Its value is defined by the equation:

$R_h=(1+\#)*D*E_t$

The term, #, is added to the expression for the Horizon Radius derived in "Gravity" because, as that text shows, energy in the form of radiation gravitates at twice the rate as energy in the form of matter. The portion, #, of the total energy of a contracting object which is in the form of radiation changes as the object contracts due to the release of gravitational energy as radiation or the conversion of radiation into matter. The material which follows has been simplified by normalizing the radius of the object in terms of R/R_h.

10.10- Since the gravitational field results from a reduction in the velocity of light in the Aether caused by the proximity of energy, the first effect to be considered is the effect of gravitational potential on the velocity of light. That effect is shown in Figure 8.4. Unless the actual radius, R/R_h, is less than about 10, the actual velocity of light, is essentially unchanged from its standard value of C. As the radius, R/R_h, approaches unity, the actual velocity of light rapidly approaches zero. As observed locally, of course, the velocity of light remains unchanged at its nominal value of C.

10.11- <u>The Actual and Locally Observed Size of a Gravitationally Collapsing Object</u>:- Since matter controls its size and its separation from other matter by a method akin to measuring the local velocity of light, the reduction of that velocity by the presence of the energy represented by a gravitating object reduces the size of all of the units of measurement by which distances are observed. At first, as an object contracts from a large radius, the contraction, as both actual and locally observed, proceeds in the manner one would anticipate from classical physics. As the actual radius, R/R_h, approaches unity, the minus sign in the basic Gravity Transformation causes the local units of measurement for length to shrink more rapidly than the actual observed radius. To an internal observer, the effect causes the velocity of contraction to slow to zero when the locally observed radius, R/R_h, has fallen to 4. (The actual value of R/R_h is 2 at this point.) As the actual value of R/R_h of that object contracts from 2 towards its limiting value of 1, the resultant reduction in size of the unit of measurement for length causes the locally observed value of R/R_h to approach infinity. The effects are shown in Figure 10.2.

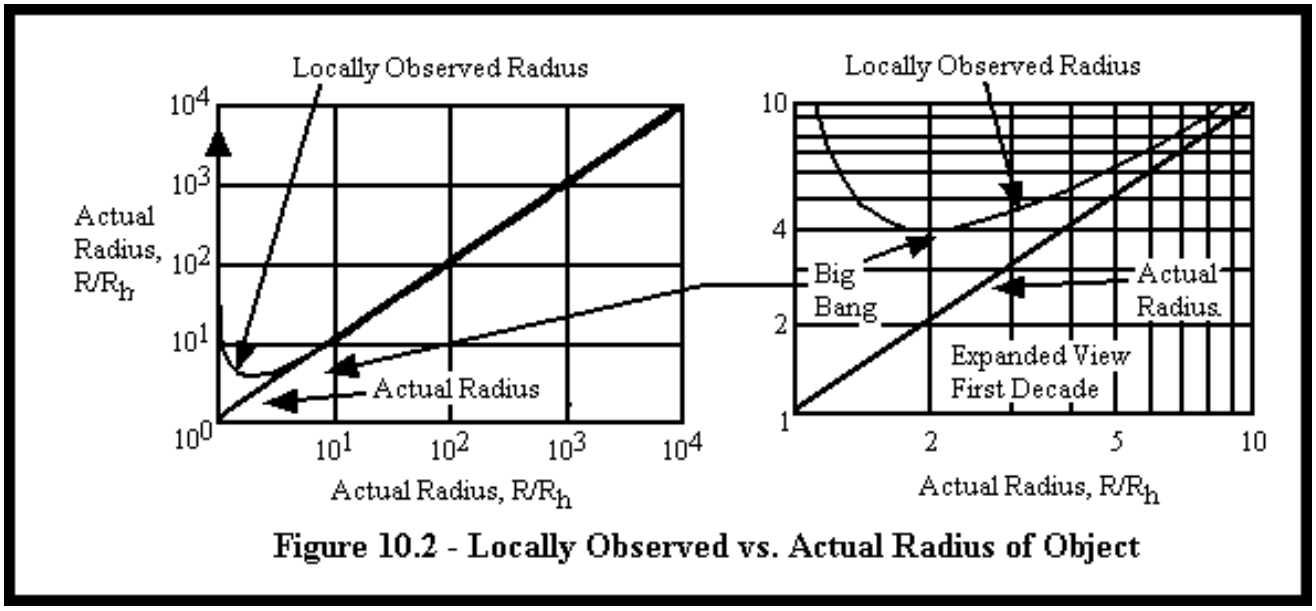


Figure 10.2 - Locally Observed vs. Actual Radius of Object

10.12- The simplified model of the gravitational field described above and illustrated in Figure 10.1 is useful in providing insight into the nature of gravitational collapse. For this purpose, the author has written a program for use on a PC to allow him to approximate the gravitational contraction of an object having a selected mass, as expressed in units equal to the Solar Mass, between the radii of 10^{10} and $1+10^{-10}$ times its Horizon Radius.

- **As the object contracts, the velocity (as a fraction of the local velocity of light) and the kinetic energy of a particle falling to the object from an infinite radius increases.**

- **The increase of kinetic energy of the falling particle raises its temperature until its kinetic energy becomes equal to its rest mass energy. At that point, its temperature no longer rises because the creation of additional matter is a higher entropy path for the absorption of the energy of fall than is an increase in the temperature of existing matter. The locally observed temperature then remains constant at about 4.25 trillion Kelvins until the final portion of the locally observed expansion phase.**

    - **The simulation assumes that once the matter creation stage is reached, internal pressures balance gravitational pressures and the velocity of fall no longer increases. The simulation was also run without allowing the creation of additional matter by allowing the actual contraction velocity to increase to the velocity of light. The only difference in the results obtained was a reduction of less than one second in the time for the process to go to completion. It seems reasonable, therefore, to accept that any effects resulting from having erroneously assumed that the velocity of collapse is limited by matter creation may be ignored.**

- **The locally observed velocity of the expansion stage is limited to the velocity of light.**

    - **This limitation is not imposed by Velocity Relativity because the locally observed expansion is not caused by velocity. The particles which are observed to be separating from each other are essentially stationary. It is the reduction in the actual velocity of light which makes them appear to be separating at a high velocity.**
    - **This limitation would result if the propagation velocity of gravitational effects is limited to the velocity of light. Since the gravitational force producing collapse propagates through the interior of the object, the force causing the collapse would then cease to act once the locally observed expansion velocity became equal to C.**

        - **Since gravitational energy is released from the energy contained in the matter and radiation within the field rather than from the field itself, there is no reason to believe that the gravitational field itself contains energy in any form. Velocity Relativity then does not impose its velocity limits of +/-C on the propagation velocity of a gravitational field. To the author's knowledge, there has been no experimental determination of the velocity of propagation of gravitational effects.**

    - **The computer simulation was run both with and without a limitation on the velocity of propagation of gravitational effects. The only significant difference was, that without this restriction, the expansion phase, as locally observed, is so rapid that nucleons begin receding from each other at faster than light velocities within a second after the expansion phase starts. Since our Universe is most certainly an ancient gravitational object which is expanding and which contains a large number of observable nucleons, the author accepts that gravitational effects propagate at the local velocity of light.**

10.13- <u>The Actual and Locally Observed Rate of Contraction of a Freely Contracting Gravitational Object</u>:- The first result of interest provided by this simulation is the actual velocity of contraction of the object as a function of the ratio between its actual radius and its Horizon Radius, R/R_h, as shown in Figure 10.3A. As the object contracts from a large radius ($R/R_h=10^{10}$), the velocity of contraction increases to slightly less than the velocity of light and remains at that level as the energy of fall begins to create additional matter instead of increasing the temperature of the matter that already exists. Beyond this point the effects of the gravitationally induced reduction in the

actual velocity of light begin to become significant. The actual velocity of contraction reduces abruptly when the actual radius falls below $4*R/R_h$ and runs into a figurative "brick wall" when the actual radius, R, has fallen extremely close to R_h because, at that radius, the actual velocity of light has become very close to zero. The locally observed velocity of contraction behaves differently as the actual radius, R, approaches R_h, as shown in Figure 10.3B. At large radii, the locally observed and actual velocities are nearly identical, but at an actual ratio, R/R_h, of about 5, the locally observed velocity of contraction begins to decrease from its value near -C (contraction), comes to rest at an actual radius ratio, R/R_h, of 2, and increases to its maximum value of +C (expansion) at an actual radius ratio of about 1.5. It maintains the locally observed expansion velocity of +C indefinitely as the actual radius, R, approaches the Horizon Radius, R_h, and the locally observed radius approaches infinity.

10.14- <u>The Effect of Gravitational Collapse on the Observed Rate of Passage of Time</u>:- The next result provided by the computer simulation is the relationship between the locally observed and actual time for the object to collapse, as shown in Figure 10.4. Since the mass of the object affects the time required by the collapsing process, the results are provided for the smallest object which astrophysicists predict as being subject to collapse, 4.5 solar masses. (The plot starts one microsecond after the start of the expansion phase in order to permit the use of an exponential scale.) It will be noted that the passage of time, as observed with local clocks, increases in proportion to the square root of the passage of time as observed with external clocks. Thus, the passage of one year inside the object requires a passage of time outside of the object which is greater than the age of our Universe. It must be emphasized that the difference in the observed passage of time does not result from a change in the actual rate of passage of time, it results from the slowing of "clocks" within the object.

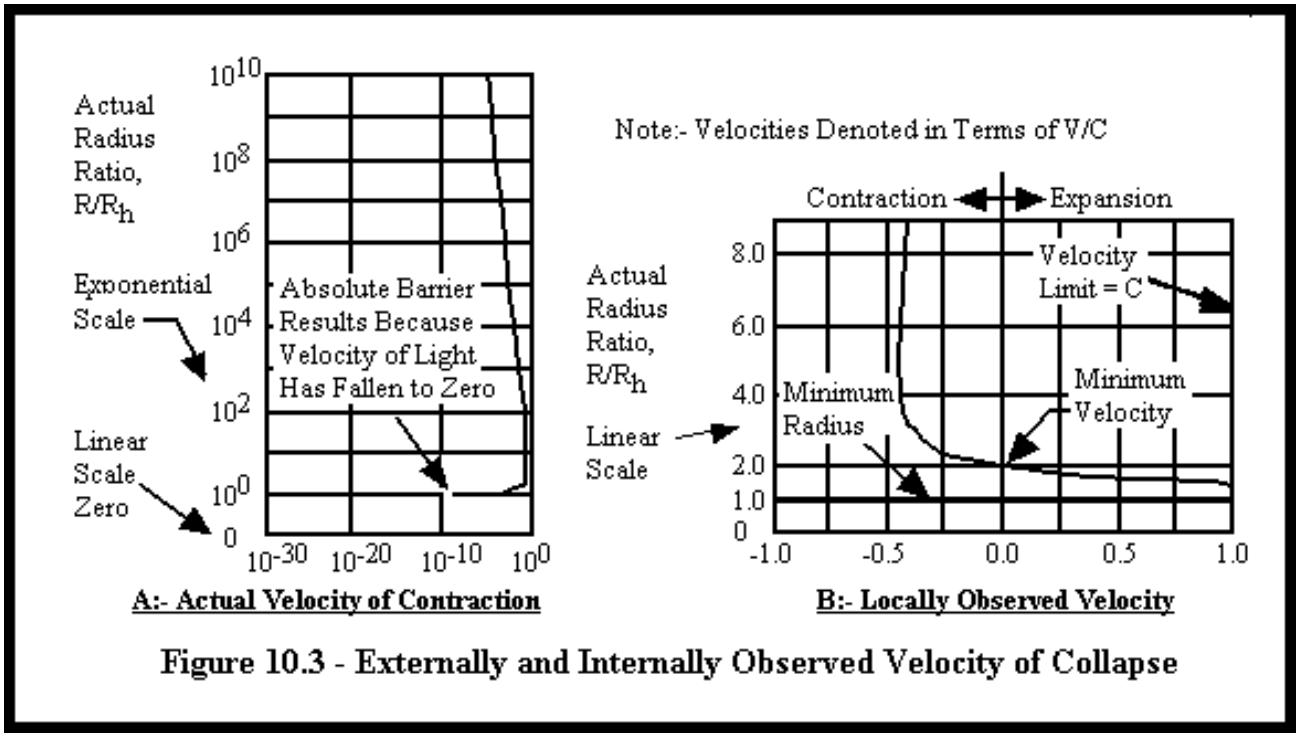


Figure 10.3 - Externally and Internally Observed Velocity of Collapse

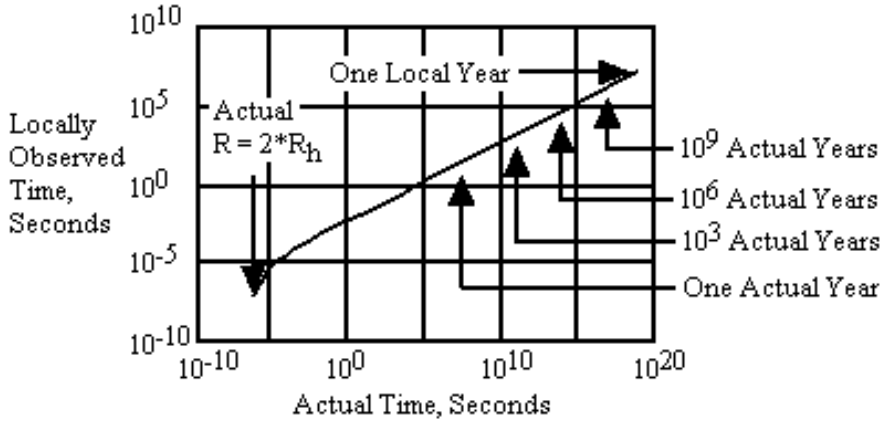


Figure 10.4 - Internally Observed Time vs. Externally Observed Time of Internal Expansion

10.15- <u>The Actual and Locally Observed Energy of a Nucleon During Gravitational Collapse</u>:- The actual slowing of the velocity of light to zero at the Horizon Radius insures that gravitational collapse will not allow the radius of an object to decrease to less than R_h in a finite time. One would hope, however, that Nature had a less namby-pamby means of terminating the process, and indeed it does. The termination of gravitational collapse occurs because, as the actual radius approaches the Horizon Radius, the radiation pressure of photons and neutrinos increases sufficiently to balance gravitational pressure. As the object contracts, its locally observed radius, as diagramed in Figure 10.2B, decreases from the radius of the star from which it was formed to a minimum of four times the its Horizon Radius. From that point on, the locally observed unit of measurement for length decreases more rapidly than the actual radius of the object. This causes the object, as locally observed, to expand rather than contract, with the locally observed radius approaching infinity as the actual radius approaches R_h. During the locally observed contraction, the energy density (mostly in the form of matter) of the object increases from that of normal matter to that of neutrons and finally to an energy density which, if the object is not too large, far exceeds the energy density of nucleons. When the inflection point shown in Figure 10.2B has been passed, the locally observed energy density of the object begins to decrease because of the locally observed increase in volume and eventually falls to the energy density of a nucleon. During this portion of the expansion process, the energy which had been stored as a result of the compression of the original nucleons is released by the expansion to form additional nucleons at an internally observed temperature of 4.25 trillion Kelvins. The process generates a large increase in the locally observed energy content of the object, both in terms of the number of nucleons present and its radiational energy, as shown in Figure 10.5A. (The reduction of the actual energy present in nucleons is shown in Figure 10.5B.) As the locally observed expansion continues, the object becomes normal matter which then expands to become a gas. The expansion associated with this phase acts to reduce the temperature of the object.

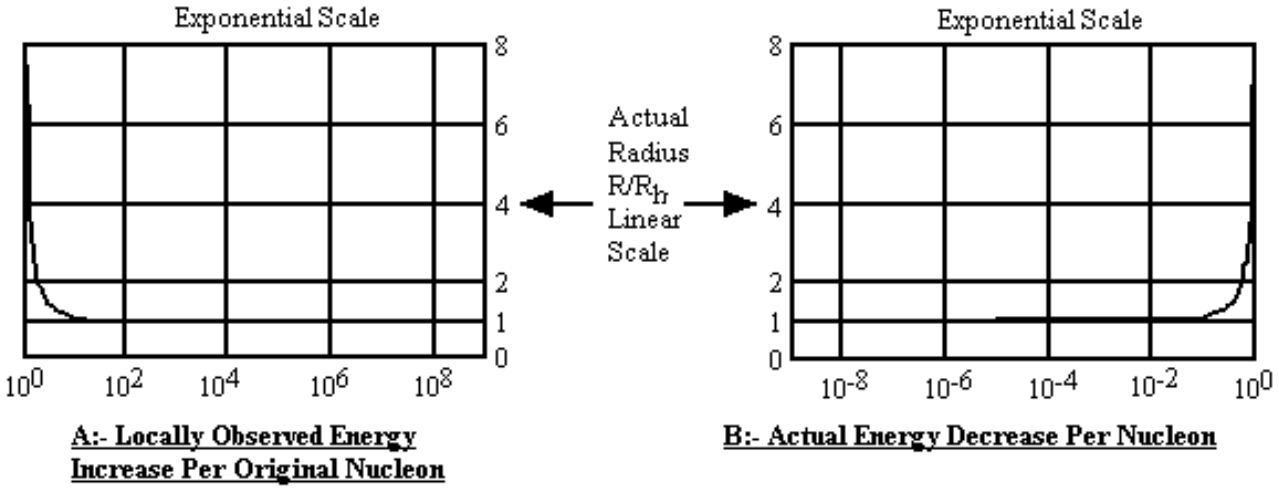


Figure 10.5 - Locally Observed and Actual Total Energy Change of Nucleon Due to Actual Contraction of Object

10.16- As the internally observed expansion phase proceeds and the temperature drops below its limit of 4.25 trillion Kelvins, matter can no longer reduce the absolute energy represented by individual particles of matter, as required by the Principle of Relativity, by creating additional matter. After this point has been reached, matter has no choice but to release energy in the form of radiation. For the small portion of its energy which is electromagnetic in nature (electrons/positrons, charge of protons/antiprotons, and the electromagnetic energy associated with the orbiting of electrons/positrons) there is no problem. The resulting radiation consists of photons and adds to the observed background electromagnetic radiation of space or, if the matter is contained within an object such as a planet or star, serves to warm that object. (Planets, for example, are observed to radiate more energy than they receive from the Sun.) The 99.95% of the energy content of matter that is contained within atomic nuclei is a different matter. Based upon the arguments provided in Chapter 13, it would seem that the required shedding of energy must be accomplished by broad spectrum radiation of neutrinos similar to the black body radiation of electromagnetic energy. Such a broad spectrum radiation of neutrinos, however, is not directly observable within the current state of the art and, indeed, may never be observable. Neutrinos are currently detectable only by their absorption by atomic nuclei. Since that interaction occurs at sharply defined frequencies, analogous to the electromagnetic spectral absorption lines of atoms, only a small percentage of the emitted neutrino radiation traversing space can be detected. (Gravitationally induced time dilation between the center of the Sun and the Earth can easily provide enough frequency shift to account for the failure of experiments designed to detect the expected emission level of neutrinos produced in Sun.) Unlike photons, neutrinos are not trapped by matter and they escape directly to space without heating the object through which they are passing. It seems reasonable to expect that the distribution of energy between photons and neutrinos in the background radiation of space would closely match the ratio of electron mass to nucleon mass of atoms. If this is the case, 99.95% of the background radiation level of space would consist of undetectable neutrinos. While this conclusion may seem extreme, in terms of background radiation temperature it is not hard to accept. Since the energy of radiation varies as the 4th power of absolute temperature, the required energy ratio is achieved if a very reasonable background neutrino radiation temperature of 22.3K coexisted with our Universe's background electromagnetic background temperature of 3.5K.

10.17- The Endpoint of Gravitational Collapse:- "Gravity", using the above model, provides the gravitationally induced pressure and the energy density of an object having a total energy of E_t, as

observed with actual units of measurement and in terms of the gravitational potential, $ (alternatively expressed as R_h/R). The derivation of these expressions did not consider that energy in the form of radiation gravitates at twice the rate of energy in the form of matter. When this effect is considered by the inclusion of the factor #, these expressions, with no energy radiated to space, become:

Gravitational Pressure = $R_h^4/[4*(PI)*D^3*(1+\#)^2*R^4*E_t^2]$

Radiation Energy Density = $3R_h^3/[4*(PI)*D^3*\#^2*R^3*E_t^2]$

And, since radiation pressure is proportional to the energy density of the radiation, the radiation pressure, P_r, is given by:

Radiation Pressure = $3R_h^3/[4*(PI)*D^3*\#^2*R^3*E_t^2]$

Equating the expressions for the gravitational pressure and the radiational pressure enables the relationship between the gravitational potential, R_h/R, and the portion, #, of the object's total energy which is in the form of radiation enables the value of # at which a pressure balances occurs to be determined. The result is plotted in Figure 10.6 as a function of the gravitational potential. The curve has been adjusted to include the effects resulting from the fact that energy in the form of radiation gravitates at twice the rate of energy in the form of matter.

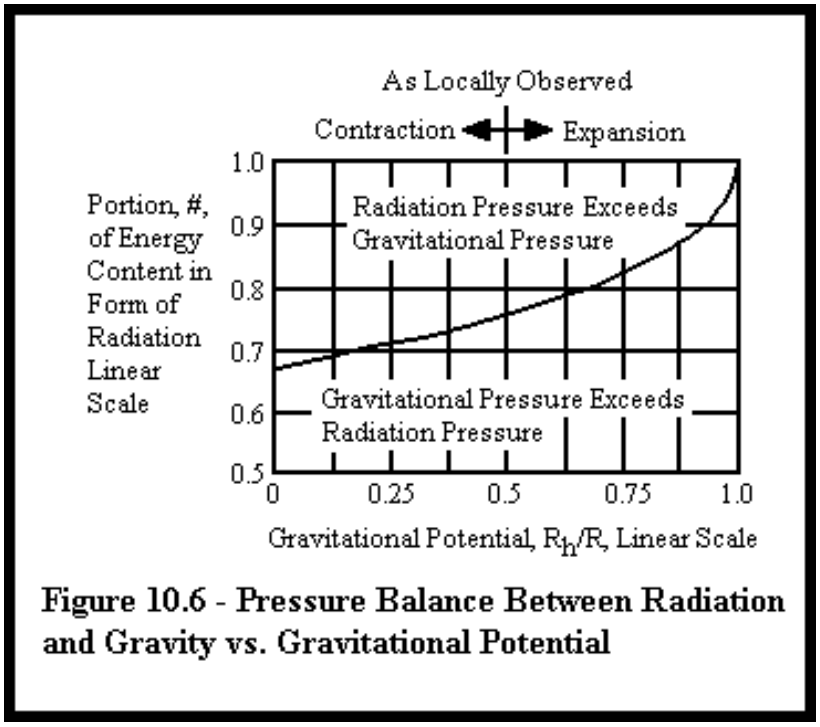


Figure 10.6 - Pressure Balance Between Radiation and Gravity vs. Gravitational Potential

10.18- As a result of radiation pressure, actual gravitational contraction comes to a halt at a radius, R, which is close to the Event Horizon radius, R_h, because further actual contraction increases the locally observed radiation pressure. Actual contraction from this point on can only continue as a result of the radiation of energy to space. For this to occur, the actual temperature of the object must be warmer than the space in which exists. As provided in "Gravity", the gravitational equilibrium temperature between space and the collapsed object imposed by the Gravitational Transformation, $(1-R_h/R)$, in terms of the temperature of the external space, &, in Kelvins, is given by:

$(1-R_h/R)=4.85*\&^{0.5}*10^{-7}$

The characteristics of a collapsed object in which all of its energy has been radiated to space has also been derived in "Gravity". Actually, the object has shrunk to the size of a mathematical point which contains zero energy. As observed locally, the object has shrunk to the radius of its original Event Horizon and contains an amount of energy which is equal to the energy originally contained in the matter from which it was formed. This energy, however, will be entirely in the form of radiation. *Gravitational collapse of an object will not go to completion as long as the temperature of the space surrounding the object exceeds absolute zero.*

10.19- The Conservation of Angular Momentum During Gravitational Contraction:-When a figure skater is spinning on the toe of a skate, her rate of spin is increased dramatically by the simple act of bringing her extended arms to her side. The effect is one of the most familiar examples of the Law of Conservation of Angular Momentum and results from two effects. In retracting her arms, the skater increases the kinetic energy of her arms by doing work against the centrifugal force of the spin. This energy, along with the original kinetic energy stored in her arms must be conserved and, in order for this requirement to be met, her angular velocity must increase. The effect obeys the Law of Conservation of Angular Momentum which states, that in the absence of external torques, the product of an object's moment of inertia and its angular velocity must remain constant. By withdrawing her arms, the skater reduces the moment of inertia of her body and her angular velocity increases accordingly.

10.20- The effect also applies to rotating objects undergoing gravitational collapse. At all points in the process, angular momentum must be conserved, both actually and as locally observed. Handbooks provide the moment of inertia of a sphere in terms of its mass, M, and its radius, R, as $0.4*M*R^2$. Since both of these quantities, and the measured rate of the passage of time are subject to the Gravity Transformations of Table 8.13.1, the relative change in the angular velocity of a collapsing object as a function of its locally observed radius is readily determined. As shown in Figure 10.7B, the relationship between the locally observed angular velocity and the locally observed radius of the object during the contraction phase is conventional. Its angular velocity increases in inverse proportion to the square of its radius. During the expansion phase, however, the locally observed angular velocity decreases in inverse proportion to the cube of its locally observed radius. The reason for the difference in behavior between the locally observed expansion and contraction phases is that the locally observed release of gravitational energy increases the object's locally observed mass. At the large locally observed radius existing late in the expansion stage, the internally observed angular velocity is indistinguishable from zero.

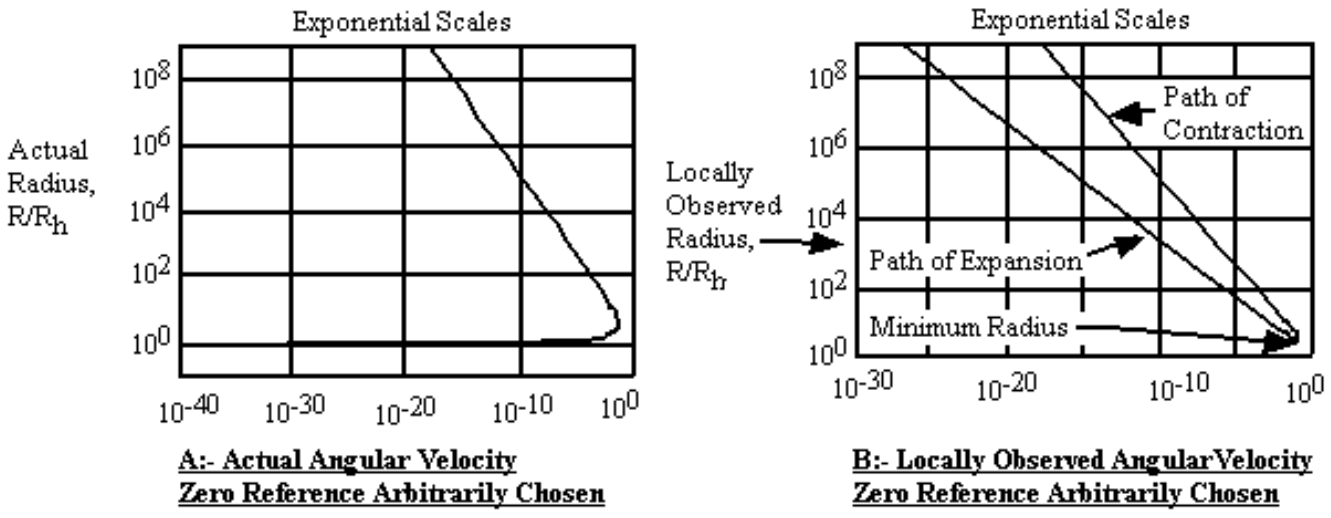


Figure 10.7 - Actual and Internally Observed Angular Velocity vs. Radius

10.21- Actually the angular velocity of a collapsing object follows a different path. For the case where no energy is lost by the collapsing object by radiation to space, the mass of the object varies inversely with the square of the velocity of light in accordance with Thomson's $E=M*C^2$ and is proportional to $1/(1-R_h/R)^4$. Figure 10.7A shows that the effect of the mass increase is small for radii which are large compared to the Horizon Radius and the object obeys the conventional Law of Conservation of Angular Momentum as it contracts. When the radius approaches the Horizon Radius, the effects of the increased mass predominate and the rotation of the object comes to a screeching halt. The abruptness of the stoppage is illustrated by Figure 10.8.

10.22- When one recognizes that our Universe is itself a gravitational object of a radius essentially equal to its Horizon Radius, as determined by the gravitational mass of the matter and the radiation it contains, it is obvious that the net angular velocity represented by that matter and radiation must be vanishingly close to zero. The gyroscopically observed zero angular velocity of our Universe is caused by the Law of Conservation of Angular Momentum operating in an 'expanding' Universe. It is not the result of the net angular velocity of all of the matter in the Universe as Drs. Einstein and Mach asserted without having presented any indication as to how such a miraculous effect might come about. Modern General Relativists assert that as a rotating object forms a Black Hole, it drags space along with it and its rotation comes to rest with respect to that space. If any reader believes either of these assertions, the author would like to hear from him. That bridge over the East River is still for sale.

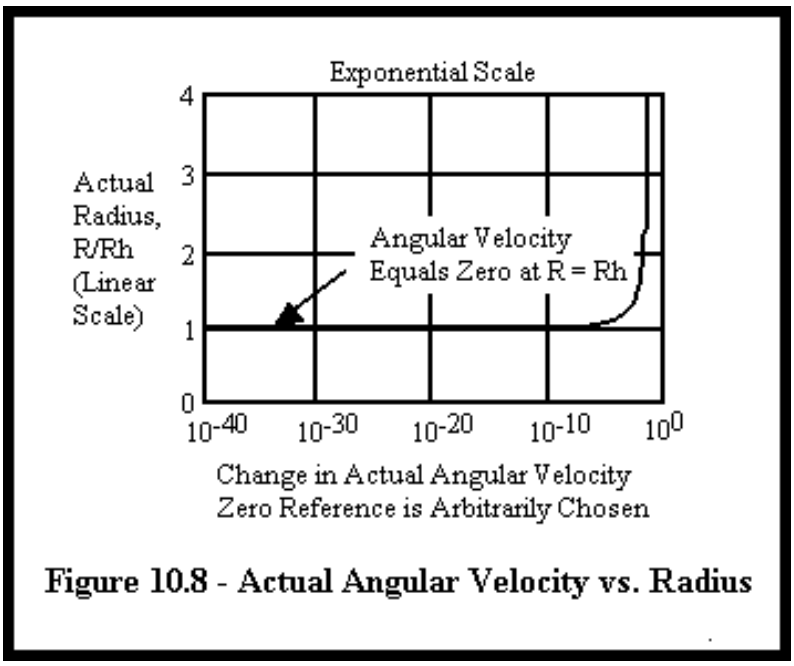


Figure 10.8 - Actual Angular Velocity vs. Radius

10.23- Gravitational Waves and Gravitons:- Since every accumulation of energy generates a gravitational field, it follows that the energy comprising every object which is undergoing spatial acceleration, such as the Moon in its orbit around the Earth, emits gravitational disturbances. If the acceleration is cyclical, the disturbances are in the form of waves which propagate throughout space and are sufficiently strong to allow their detection, at least in principle, at extreme distances. As is the case for all types of radiation, the wavelength of such a gravitational wave is determined both by the frequency of the cyclical motion generating it and the velocity of the wave's propagation. (If one assumes that the velocity of propagation of a gravitational effect is infinite, gravitational waves can be considered to be a waves of infinite wavelength.) Gravitational waves are implicit in both Newton's and Einstein's concepts of gravitation as well as in Gravity Relativity. Since it has had to be obvious to anyone who has thought about the subject during the intervening years since Newton that gravitational waves propagate throughout the Universe, the practice of crediting Dr. Einstein with predicting their existence seems to be somewhat of a reach.

10.24- A gravity wave is emitted by an accelerated source, such as an object in orbit about another object. Newton's Second Law of Motion requires that interacting objects maintain a common center of gravity which remains stationary. As an example, the Moon does not orbit the center of the Earth. The focus of the orbits of both the Earth and the Moon is at their common center of gravity, about 1000 miles below the Earth's surface on the side nearer to the Moon. As they move in their respective orbits about this focus, both the Earth and the Moon radiate gravitational waves. This radiation can be observed in the near field as separate gravitational waves produced by the orbital motions of the Earth and of the Moon. It cannot be observed in the far field because detectors in the far field lack sufficient angular resolution to distinguish the Earth and the Moon as separate sources of gravitational radiation and sense only the net gravitational field from their stationary center of gravity. In the far field, the gravity wave from the Earth is canceled by the gravity wave from the Moon.

10.25- The meaning of near field and far field detection of radiation can be understood by considering the observation of a police car approaching at night along a straight desert road with its headlights flashing alternately. While each headlight is alternately turned on and off, the total light emitted from the car remains constant with its source moving from one side of the car to the other. When the car is 5 miles away, the limited resolution of the observer's eyes prevents him from seeing the headlights as individual light sources, he sees them in the far field as a single source of constant intensity. When the car approaches to within 1 or 2 miles, near field detection begins because the observer's eyes are capable of resolving the two headlights as separate sources. He then observes the cyclical flashing of each headlight, and the light source is seen to move from

side to side.

10.26- Near field observation of the gravitational waves of the Earth-Moon system has been a fact of life throughout history. We live in proximity to a highly effective near field gravitational wave detector, the ocean. The output of this near field detector is the daily change of the time of high tide. However, when it comes to the detection of gravitational waves from, for example, closely spaced binary stars, any detector which can be built on Earth will be a far field detector. Its angular resolution is limited by the size of the Earth and will be many orders of magnitude too coarse to allow it to resolve the gravity wave components of any possible source. The gravity waves will be there, but the detector will be unable to find them. Attempts to detect gravitational waves are doomed to failure and consequently are a waste of time, money, and even more significantly, valuable talent. The only evidence we see, or probably ever will see, of gravitational radiation from distant orbiting objects is the decay of their orbits resulting from the loss of energy that such radiation implies. The Universe completely surrounds any source of gravitational radiation and consequently behaves as a near field absorber of its energy.

10.27- There are numerous mentions in the literature of as yet unobserved particles named gravitons as being the carriers of gravitational force. The concept of gravitons arises as an analog to the virtual photons which allegedly produce the electromagnetic forces. Aside from whether or not virtual photons exist, there is no requirement for gravitons to be any more than a figment of the mathematical physicist's imagination and are generated by his need to explain gravity's ability to act at a distance without accepting the existence of the Aether. Since the gravitational field does not contain energy itself, but only modulates the behavior of the energy which is already present, there is no theoretical requirement for it to be quanticized. Unless they are observed or are shown to be required, it seems reasonable to take the position that they are a fiction.

Chapter 11 - Gravitational Collapse and the Creation of a Universe

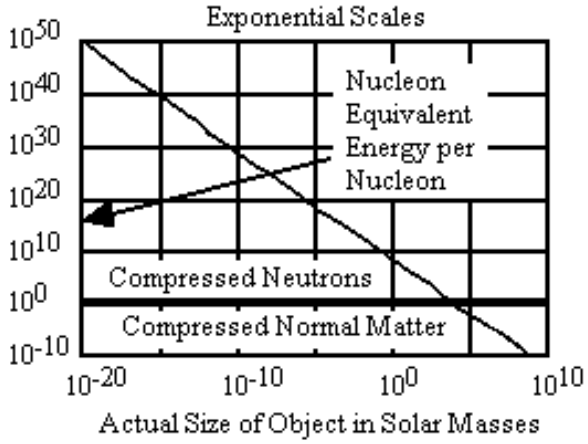
11.1- If one examines the implications of Figure 10.2, it is apparent that every object which undergoes gravitational collapse creates another universe within a sphere having an actual radius slightly in excess its Horizon Radius. As we have seen, as the object's actual radius contracts towards the Horizon Radius, its locally observed radius initially contracts and then expands. From this point on, gravitational contraction causes the object's locally observed radius to increase and approach infinity. The fact that the Gravity Transformations for Length and for Energy are identical causes both the locally observed energy content of the object and its locally observed radius to approach infinity at the same rate. Since the volume of a sphere varies in proportion to the cube of its radius, once the locally observed expansion phase begins, the locally observed energy density of the object decreases in proportion to the square of its locally observed radius. (The combined effects of the Gravity Transformations on the units of measurement of both length and energy cause the point of maximum locally observed energy density to shift from its nominal value of $4*R_h$ to $4.1*R_h$.)

11.2- As shown in Figure 11.1A, computer simulation reveals that the maximum locally observed energy density of the collapsing object, expressed in terms of nucleon energy per original nucleon, varies inversely with the square of the the actual energy content of the object. At the point of maximum locally observed density, the nucleons of objects smaller than 185 actual solar masses are compressed and energy is stored within them. As the subsequent locally observed expansion phase proceeds, the excess locally observed energy stored within the compressed nucleons is released in a manner which follows the highest entropy path. As a result, the additional nucleons shown in Figure 11.1B are created while the locally observed temperature of 4.25 trillion Kelvins

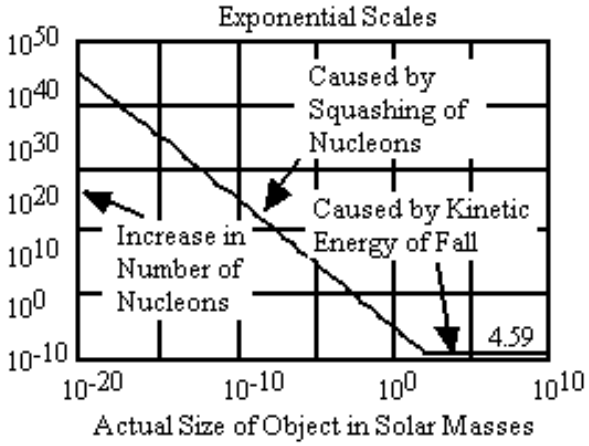
generated during the contraction phase remains unchanged. Local observations made late in the expansion phase and extrapolated backwards in time to the beginning would lead to the conclusion that matter boiled into being from nothingness and then expanded to become normal matter embedded in a sea of intense radiation. The object, as locally observed, then continues to expand and cool as a gas and, as the locally observed expansion proceeds, additional energy is released from matter to retard but not stop the cooling process. Eventually the object, as locally observed, becomes sparsely populated with matter and the bulk of its energy content is in the form of radiation. The actual contraction and the corresponding locally observed expansion, are finally limited by a balance between gravitational and radiational pressure as a function of the factor #, as shown in Figure 10.6. The collapse of objects more massive than 185 solar masses does not cause compression of nucleons because the volume of such objects at $R=2*R_h$ is sufficient to prevent nucleon compression. For such objects, the energy of fall from an infinite distance causes an increase in the number nucleons by a factor of 4.59.

11.3- Since astrophysicists teach that only objects having an externally observed size larger than 4.5 Solar Masses will undergo gravitational collapse, it is reasonable to use the Gravitational Transformations to examine the interior of such objects after they have undergone that collapse but have not radiated energy to external space. Late in its locally observed expansion stage we would find that:

- **The object consists of mostly empty space filled with radiation.**
- **Nucleons within the object are organized in strings of varying lengths up to a significant portion of the size of the object. If the object is sufficiently large, these strings eventually contain stars and galaxies.**
    - **Workers in the field of plasma physics have shown that electric and magnetic fields in space are capable of organizing matter in this manner. ("The Big Bang Never Happened" by Eric Lerner, Times Books.)**
- **The object will be observed to be expanding towards an infinite radius with the fraction of its total energy which is in the form of radiation, #, approaching unity.**
- **Extrapolation of observations of the expansion process backwards in time will lead to the conclusion that the object began with an eruption of matter into existence. Simplistically, it would be concluded that the matter was created from nothingness at a single point in space.**
- **The radius of the object will appear to be increasing at the velocity of light.**
- **The object will be composed entirely of normal matter or of anti-matter but it will not contain both types.**
    - **Mutual annihilation will cause matter and anti-matter in the original cloud to annihilate each other until only the predominant type of matter remains.**



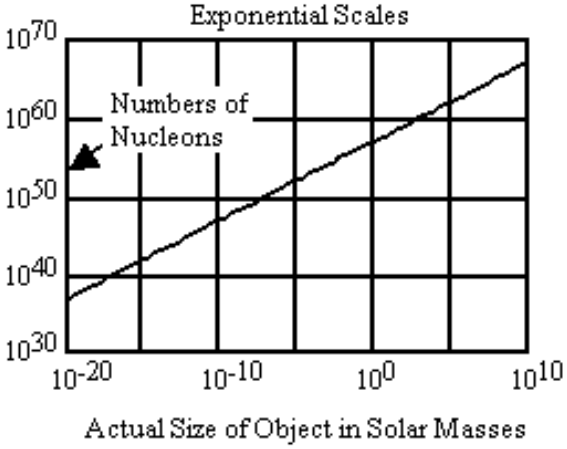
A:- Locally Observed Addition of Energy to Nucleons at Peak of Locally Observed Compression



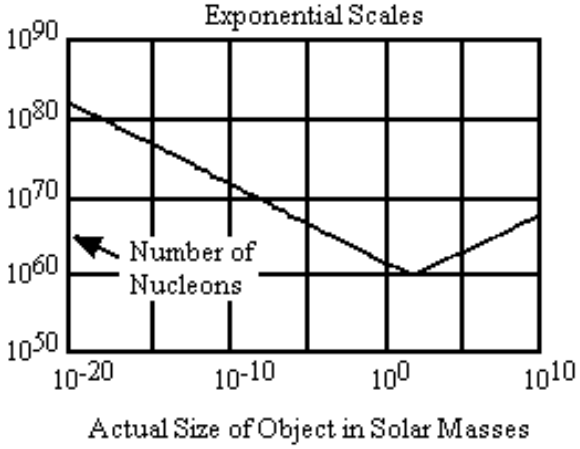
B:- Nucleon Multiplication Resulting From Locally Observed Expansion

Figure 11.1 - Effects of Locally Observed Compression on Energy Added to Initial Nucleons and to Number of Nucleons Present After Re-expansion

This description might well apply to our own Universe if it were not for one difficulty. Our Universe contains 10^{80} nucleons. As shown in Figure 11.2A, the nucleon content of a collapsed object is determined by its actually observed size and, for the collapsed object to contain 10^{80} nucleons, the actually observed size of the collapsing object would have to be on the order of $2*10^{12}$ kilograms (approximately that of a rock having a diameter of a kilometer), as shown in Figure 11.2B. Since gravitational collapse does not occur in objects smaller than 4.5 actual solar masses, our Universe could not be formed in this manner unless an additional factor was present.



A:- Number of Nucleons Before Contraction



B:- Number of Nucleons After Locally Observed Expansion

Figure 11.2 - Number of Nucleons Before Contraction and After Locally Observed Expansion vs. Size of Object

11.4- While it might be questioned as to whether the process of gravitational collapse qualifies as the creation of a universe, such an objection is groundless. Initially the object is collapsing in an

existing universe. As observed in that universe, the object collapses to a small ultra dense and ultra hot sphere containing a greatly increased number of collapsed nucleons which shrink in size until the object appears to be virtually devoid of matter and is filled almost entirely with radiation. As observed within the object, the description of the initial stages are virtually identical until after the point of maximum energy density has been reached. From that point on, additional matter boils into existence from what seems to be nothingness and the object then expands and cools until it becomes an extremely large object expanding at the velocity of light. At that point. the density of matter has become low and the object consists primarily of radiation. The large locally observed size and energy content of what is actually an extremely small object containing almost no energy results from the gravitationally induced change in the size of the units of measurement acting in concert with the Principle of Relativity. Even though the boundaries of the object are no longer hot or dense, there is no possible escape from the universe represented by the interior of the collapsed object to the universe in which it resides. The energy required for a nucleon to escape from the object is too great. It would be hard to imagine anything which is more qualified to be classified as a universe as the collapsed object.

11.5- It remains to be explained how a universe the size of the one in which we live might be formed by gravitational collapse if collapse does not occur in objects smaller than 4.5 solar masses. To illustrate how the author believes our Universe was formed, the radii ratios, R/R_h, where the gravitational squashing of nucleons occur, are plotted in Figure 11.3A. In order to magnify the effects of interest, the vertical scale is plotted in terms of (R/R_h-1) rather than R/R_h. (It is the minus sign in the Gravitational Transformation which produces the effect of the field.) As an example, the gravitational collapse of an object of 4.5 solar masses is shown on this plot under conditions where no energy is lost by radiation. (In reality, energy is always radiated.) To show how the loss of energy to space by radiation allows the creation of an extremely large universe, the region of squashed neutrons is replotted in Figure 11.3B with the vertical axis shown in terms of actual meters. This plot shows the gravitational collapse of an object of 4.5 solar masses with the effects of radiational heat loss included. (With the plot scale employed, the region of locally observed expansion is sufficiently narrow to be contained within the width of the lower line.) As the object collapses, it radiates energy to space. That energy loss moves it to the left in Figure 11.3B, as typified by the arrow from point '1' to point '2'. The movement to the left, in turn, means that in terms of its Horizon Radius, it is now too large and must contract further, as typified by the arrow from point '2' to point '3', to again coincide with the lower line, generating more nucleons in the process. The process is continuous and the loss of energy to space by radiation causes the object to move to the left along the lower boundary line. Eventually the object achieves a thermal balance with the external space and, from that point on, the object remains on the lower line of the curve with a # factor virtually equal to unity. Further actual collapse and locally observed expansion can only result from a reduction of the temperature of the space surrounding the object. (That space is colder than the lowest temperature achieved or likely to be achieved in a laboratory.) It is interesting to note that Figure 11.3B indicates that the actual radius of a universe having the locally observed size of our own is about 1/1000 of the size of the neutron! Talk about making more and more from less and less.

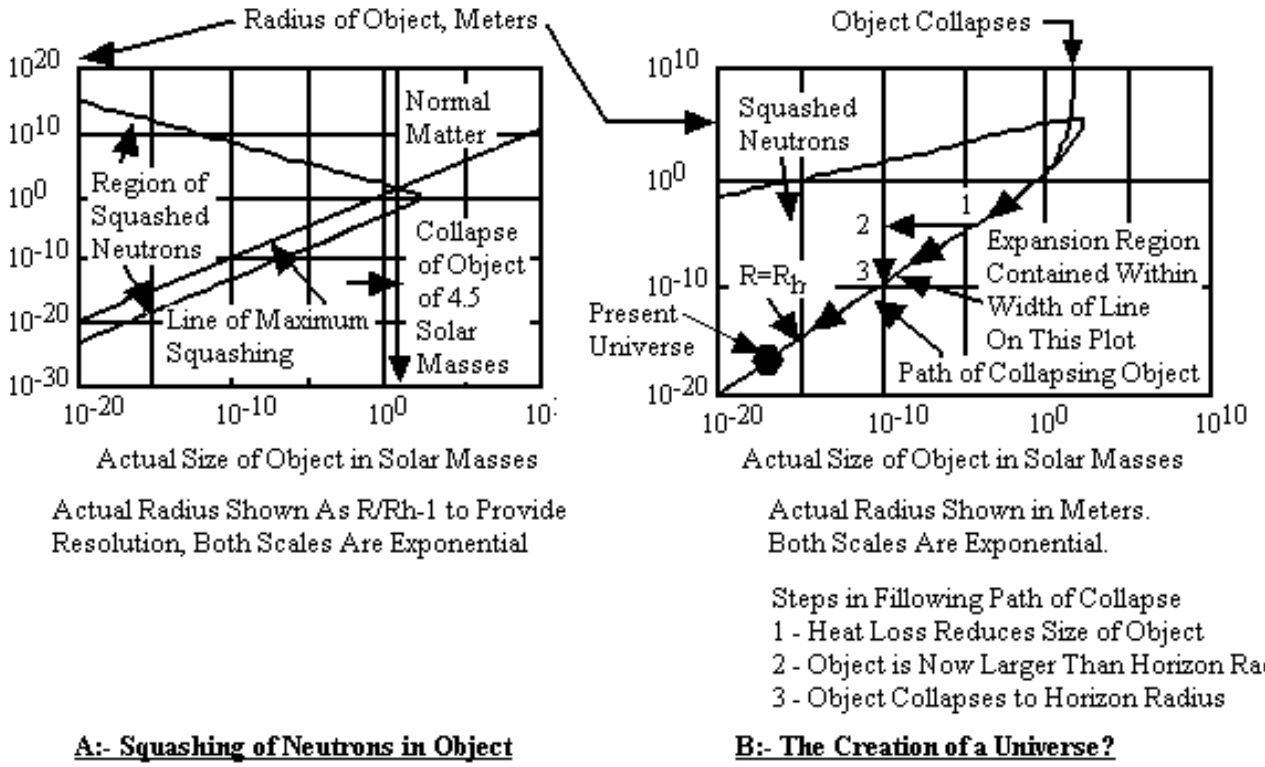


Figure 11.3 - The Compression of Nucleons and the Creation of a Universe

11.6- The examination of gravitational collapse does, however, answer the question as to the final fate of our Universe. In "Gravity", the parameters of a gravitationally collapsed object which had radiated all of its energy to the external space are provided. Such an object has actually reached a zero radius and zero energy content and consequently has ceased to exist. To the local observer, the radius of the object and its Horizon Radius have become infinite. The cosmic crunch which has been postulated as the possible end of our Universe will not occur. The Universe, as locally observed, will expand and cool forever as it shrinks to an actual mathematical point.

11.7- The process of gravitational collapse implicit in the Gravity Transformations suggests an interesting scenario. Initially, a single universe contains particles of matter and anti-matter which annihilate each other and release radiation when they meet. In turn, radiation of sufficient energy, after a time, recreates particles of matter to replace the matter which has been annihilated. Eventually the process causes matter and anti-matter to sort themselves into separate groups from which gravitational objects composed of either normal matter or anti-matter can form. Any such objects having a size of at least 4.5 solar masses then contract to form independent universes which may eventually become as large or larger than our own. Within each of these universes, an enormous number of gravitational objects form and undergo their own gravitational collapse to become the next generation of universes. As long as the key parameters which determine the behavior of matter, radiation, and gravitation have Gravitational Transformations equal to unity, the number of generations of universes which can result from this process would seem to be unlimited. The relevant transformations listed in Table 8.13.1 meet this requirement. The Gravity Transformations for Planck's Constant, the Dielectric Constant, the Ergo-gravitational Constant and the Fine Structure Constant are all equal to unity and, if the Principle of Relativity is rigorously valid, then all other fundamental parameters will meet this criteria. There may be, however, an observational disagreement with the concept of an unlimited number of generations of universes. The velocity at which astronomical objects recede from each other due to the "expansion" of our Universe has been reported to vary in steps of about 70 kilometers per second rather than varying

uniformly with distance. If this effect actually occurs and if it does not result from an explainable cause, the absolute validity of the Principle of Relativity, and more particularly the knowledge which flows from that principle, would be in question. *Otherwise, reality may well be the grandfather of all fractals with its basic pattern being that of an individual universe.*

11.8- As will be discussed in the next chapters, the possibility exists that, in the original universe (an ancestor of our own) the velocity of light and the velocity of the quantum field are equal but, while the velocity of light is reduced by the proximity of energy (gravitation), the velocity of quantum field(s) may be affected to a much smaller degree, if at all. If this is the case, the physics of the original universe would differ greatly from the physics of subsequent generations of universes. However, the physics of the later universes should be essentially identical.

Chapter 12 - The Space Time Continuum

12.1- In our conventional experience, an event is normally considered to take place at a location described in terms of three spatial coordinates and one temporal coordinate. For example, if a light bulb is turned on in a room, the source of that light might be described as being four feet from the north wall, three feet from the east wall, and five feet from the floor and the time at which the light was turned on might be described as 2:04 PM on July 3, 1996. One might then ask why Nature employs three spatial dimensions and one time dimension as the basic structure of reality. Why isn't reality built with a different number of spatial dimensions (eg:- one, two, four, or five)? Why does it have a single time dimension along which reality progresses in a single direction from past to future?

12.2- Three Dimensional Euclidian Space:-To examine such questions consider first the possibilities inherent in continuums differing in the number of spatial dimensions they contain. A space consisting of zero dimensions is a mathematical point and events cannot occur. There would not be room. A space consisting of one dimension is a line and, while it can exist, events still cannot occur because points located along that line cannot pass each other to change their sequence. For events to occur, a space of two orthogonal spatial dimensions is required so as to allow points to change their relative locations by going around each other but, for those events to occur, energy must be present to cause them. Energy is a force acting through a distance and, as distance uses up one of the two spatial dimensions, the force must be applied to the remaining spatial dimension. Since that single spatial dimension is a line, it has zero cross-sectional area and the slightest force applied to it will produce an infinite pressure. Energy and the events that energy cause cannot exist in a continuum of two spatial dimensions because infinite pressure is infinitely destructive. Adding a third spatial dimension relieves the difficulty. A force acting along one of the spatial dimensions is then applied to the area represented by the remaining two spatial dimensions and the pressure resulting from the presence of energy remains finite. Except for the conceptual detour introduced by General Relativity, three spatial dimensions would seem to be adequate for Nature's purposes. (Some authors have stated that stable orbits are not possible in a universe having four or more spatial dimensions.) While the author is certain that many physicists will object strongly to the author's conclusions with respect to the dimensional content of space, their disagreement can only considered to have substance if it is accompanied by a demonstration of a small displacement, perhaps a fraction of an inch, in a direction which is orthogonal to our three familiar spatial dimensions. The only justification for a belief that space is represented by a three dimensional non-Euclidian geometry are observations which have been made between reference frames differing in elevation without a correction for the effect of elevation differences on the units of measurement having been made. There is no kind way to say it, those observations represent bad science. When the proper corrections are made, the geometry of space is found to be three dimensional Euclidian.

12.3- Lest there be a misunderstanding, the author has no quarrel with the use of non-Euclidian or multi-dimensional geometry in the mathematical solutions of physical problems. Because the pseudo-dimensions of non-Euclidian and/or multi-dimensional geometry have a property which they share with spatial dimensions, non-interaction between axes, their pseudo-geometry can be quite useful in the solution of physical problems. It is not clear, however, that non-Euclidian geometry can deal correctly with phenomena which involve energy. The author's objection occurs when physicists who have learned their profession by rote assert that the pseudo-geometry of curved space represents reality. Such individuals are apparently satisfied to perform their calculations without understanding the reality they represent and, as a result, can easily be misled when they interpret their findings.

12.4- The Time Dimension:- Nature requires one more dimension in order to function. It requires the dimension of time. The three spatial dimensions provide the room for events to occur and allow the energy required to impel those events to exist. The changes which events represent occur in a sequence which may be considered to be a translation of the three spatial axes along an axis which is orthogonal to them. The effect of that translation of the three spatial axes results in the passage of time in which the present follows the past and the future follows the present. The fourth dimension does not relate to where, it relates to when.

12.5- The passage of time is intuitively obvious. The question which that passage poses is why it progresses from past to future and not from future to past. If the events which are considered are simple enough, there is no way to tell the direction of time. A motion picture showing the impact of two billiard balls appears quite reasonable when it is projected in the forward or in the reverse direction. The situation is different if the motion picture shows the initial break of the balls in a game of pool. If the motion picture is run in the normal direction, the cue ball is observed to strike a triangular cluster of 15 balls. The 16 balls then move in 16 different directions at 16 different velocities and the observer considers the display to be quite reasonable. If the motion picture is run backward, 16 balls approach each other at 16 different velocities from 16 different locations and arrange themselves with 15 of them in a compact stationary triangle and with a single ball departing from the apex of the triangle at a high velocity. An observer viewing such a display will conclude that the motion picture has been run backwards because the probability of the events, as displayed, occurring naturally is vanishingly small.

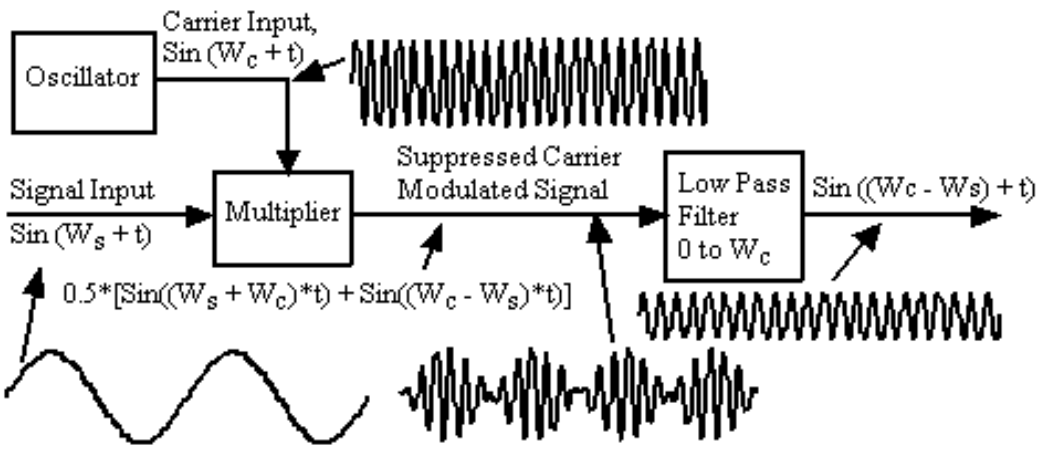
12.6- There is a fundamental difference between the two examples. In the case of the impact of the two billiard balls, there is no change in the amount of information present before and after their impact. The total relevant information prior to impact is the position and velocity of two billiard balls. The situation is different in the case of the breaking of a rack of pool balls. Prior to impact, of the 16 balls involved, 15 of them are locked into a pattern which has a single position and zero velocity while the 16th ball has both a velocity and position. Only four significant items of information exist. Following the impact of the cue balls, 16 balls have individual positions and velocities and 32 significant items of information exist. (Two items of information are required to represent position and velocity on the surface of the two dimensional table. They are each treated as a single item to avoid complicating the discussion.) One is led to the conclusion that the flow of time from the past to the future is accompanied by an increase in the total amount of information or its equivalent, the total quantity of entropy, in the Universe. Since both gravitational collapse and the universe creation process described earlier involve an enormous increase in total information content, time must progress in the direction of that collapse, from past to present to future. In Chapter 10 it was shown that the energy content of all matter was higher in the past and will be lower in the future. A reversal of the flow of time, even locally, would require an enormous input of energy.

12.7- Surprisingly, there seems to be a school of thought among physicists that Special Relativity allows it to be possible to transfer information from the future to the past if faster than light communication could be achieved. Their concept is based upon the idea that if points A and B were physically separated but moving at the same velocity, an observer at point A could consider that

points A and B were moving in a direction from B to A. As a result, a signal sent to point B at a velocity greater than the velocity of light would arrive before it was sent. Similarly, an observer at point B could consider that points A and B were moving in a direction towards point B and that a signal sent to point A at a velocity greater than the velocity of light would also arrive before it had be sent. They then conclude that if a faster than light signal were sent from B to A the instant that a faster than light signal was received from A, the round trip signal from A to B to A would be received before it had been sent and a signal would have been received from the future. Fortunately for the casino industry, faster than light communication will not achieve such a result. The fallacy is that, while it is legitimate to accept that a faster than light signal sent from A to B can be considered to arrive before it was sent and it is also legitimate to consider that a faster than light signal sent from B to A can be considered to arrive before it was sent, it is not legitimate to hold both viewpoints simultaneously because that view point requires A and B to be moving at two different velocities at the same time. Communication or travel from the future to the past is not possible under any legitimate physical theory. It only appears possible if one's reasoning processes are limited.

12.8- The Barrier at the Past-Future Interface:-The concept of negative time appears many times in mathematical treatments of physical problems ranging from Dr. Feynmann's observation that it is impossible to distinguish between a positive electron traveling forward in time and a negative electron traveling backwards in time to an analysis of AM radio communication. While many individuals consider that because mathematics allows and in many cases requires the concept of negative time, that, in natural processes, time must actually be able to flow in reverse. This presents another situation where one must never ass*u*me.

12.9- A similar effect occurs in suppressed carrier modulation of radio signals, as shown in Figure 12.1. Mathematically, the process consists of the multiplication of the input signal (simplistically shown as a simple sine wave at a frequency of w_s) by the sinusoidal carrier frequency, w_c. The result of the multiplication process is two signals, one of which is the sum of the two frequencies and the other is the difference between them, as shown. Passing the composite signal through a low pass filter rejects the higher frequency signal and provides a single signal at the difference frequency which contains all of the information originally present and which occupies half of the bandwidth and requires one quarter of the peak power of a conventional AM radio transmission. (Passing the signal through a high pass filter eliminates the difference frequency signal and transmits the sum frequency signal.) The spectrum of the suppressed carrier modulated signals is shown in Figure 12.2A. With a zero frequency signal, the sum and difference frequency signals superimpose at the carrier frequency. When the signal frequency is equal to half of the carrier frequency, the difference frequency signal also appears at half of the carrier frequency while the sum frequency signal appears at 1.5 times the carrier frequency. The interesting case occurs when one considers the signal frequency to be higher than the carrier frequency. A simple minded mathematical analysis suggests that, for a signal frequency 1.5 times the carrier frequency, the sum frequency will be 2.5 times the carrier frequency (perfectly reasonable) but the difference frequency will have the unreasonable value of minus one half of the carrier frequency. In order for that to occur, time would have to flow in reverse. Nature, however, does not allow this to occur. Instead, the actual physical process relies upon the symmetry of the sinusoidal function to allow the reflection of the difference frequency signal from a "mirror" at the past-present interface and appear as a phase inverted signal at half of the carrier frequency. The reflection process at the past-present interface is analogous to the reflection of an image from the mirror of Figure 12.2B.

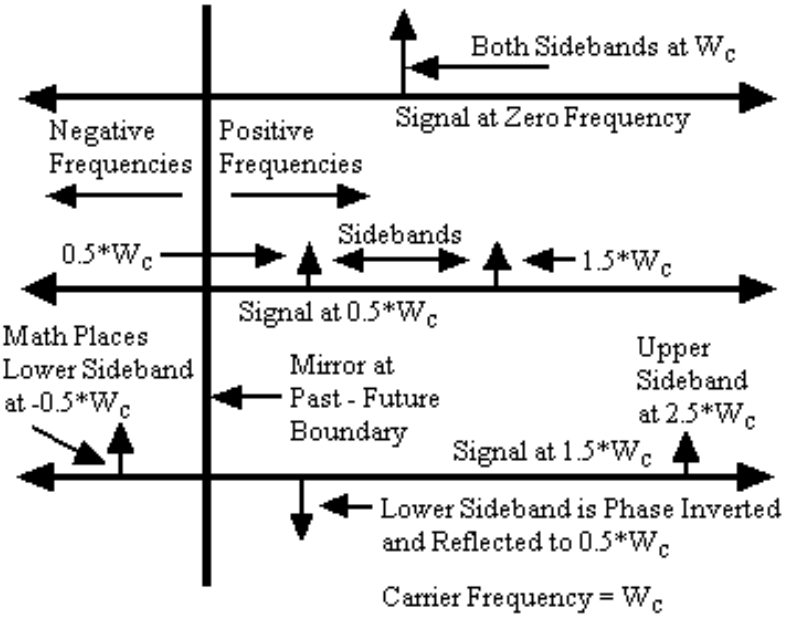


Note:- Low-pass filter rejects upper sideband to produce signal of frequency lower than carrier frequency as shown. Substitution of high-pass filter rejects lower sideband and produces signal higher in frequency than carrier frequency (not shown). Both sidebands contain identical information.

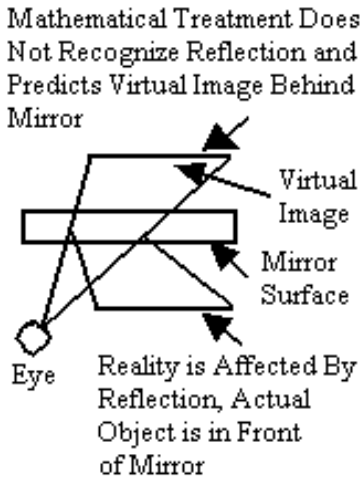
Figure 12.1 - Suppressed Carrier Modulation of Electromagnetic Signals

12.10- There is an additional factor involved in the passage of time. Information about the past can be remembered in the present while information about the future cannot, at least to a degree which is subject to rigorous verification. This leads to the conclusion that information can only flow from the past to the present, but that conclusion may not be completely true. The Bible recounts the predictions of the Prophets and asserts that many of them have come to pass. It is claimed that psychics can, at times, foresee the future. Individuals have reported experiences which might be interpreted as a memory of a future event and, in the process, some have predicted significant events prior to their occurrence but their reports are invariably attributed to coincidence or outright fakery. Rejection of the possibility by orthodox science may be not be rigorously valid. Information does not necessarily involve energy (e.g.- information represented by the polarization axis of a photon) and, if the information does not involve energy, its transfer is not necessarily subject to all of the limitations that Nature imposes upon the transfer of information represented by energy. Perhaps there is a backflow of information from the future to the present, but, if that back flow is small compared to the the forward flow of information from the past to the present, experiments will always prove that the reverse information flow path does not exist. Cultural bias acts to prevent the experimental recognition of such an effect, particularly since even the smallest degree of reverse information flow would result in severe philosophical paradoxes.

12.11- Space, Time and Coordinate System- One must recognize that space is a basic characteristic of reality and as such is instinctively understood by all mobile creatures. It is only symbol using mankind that associates a coordinate system with space in order to be able to quantify it. Matter exists in space just as you currently exist in the room in which you are reading this text, but like your room's relationship to you, it continues to exist when you are absent. Space is an unchanging volume (in the "absolute" sense) which may or may not contain energy or matter but which does contain something since it has observable properties such as a dielectric constant, permeability, a barrier which prevents energy from exceeding the velocity of light and perhaps other properties which are yet unknown. It is characteristic of space that those properties are affected by the presence of energy and cause matter to reduce its size and to lose energy thereby causing an internal observer to falsely conclude that space has been created by the proximity of energy.



A:- Spectral Components of Suppressed Carrier Modulated Signal Showing Reflection at Past-Future (Zero Frequency) Interface



B:- Optical Analog of Time Reflection

Figure 12.2 - Reflection at Interface Between Past and Present

Chapter 13 - The Nature of Particles

13.1- As shown earlier, logical deductions based upon physical observation and experiments by quantum physicists have demonstrated that space must be filled with the Aether of the Lorentz Contraction-Aether Theory rather than the nothingness asserted by adherents of Special Relativity. Furthermore, not only must the Aether be a solid in order for it to propagate the transverse vibrations of electromagnetic radiation, that solid must be absolutely continuous if the marvelous mechanism we experience as reality is to function. (If one observes a conventional automobile traveling down a road, he is safe in concluding that the car has a driveshaft of some type between its transmission and wheels even though he cannot observe that shaft.) The conceptual difficulty that remains is that, while a solid Aether is compatible with the propagation of radiation, solid particles should not be able to move through it. One might conclude that space must both be filled with the Aether and be devoid of the Aether, an obvious absurdity. Nature, however, is a resourceful old bird and has apparently solved the problem in what may be the only way possible. The author believes it configures a wave so as to cause it to behave as if it were a particle. To examine this possibility, it is first necessary to examine the electromagnetic wave and the photons which comprise that wave.

13.2- Consider an electromagnetic wave resulting from the transmission of a vertically polarized signal by a radio transmitter, such as illustrated by Figure 13.1. While it is common practice to consider that such a wave is continuous, progressively reducing its intensity eventually reveals it to be composed of discrete packets of energy called photons. In order for this to be the case, the wave must be composed of synchronized photons which reinforce each other so as to propagate as an apparently continuous wave. Photons must have the following characteristics:

- **Separately, the photons must be electromagnetic impulses propagating at the velocity of light.**
- **The net electric, magnetic, and mechanical effects of each impulse must equal zero when averaged over time.**

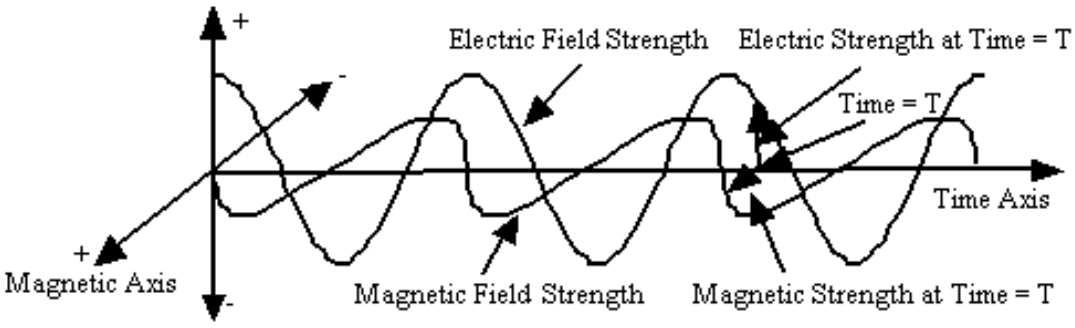


Figure 13.1 Electromagnetic Wave Propagating at Velocity of C

- **When a sufficient number of these impulses are superimposed with the appropriate timing and phasing, they must produce the apparently continuous electromagnetic wave of Figure 13.1.**

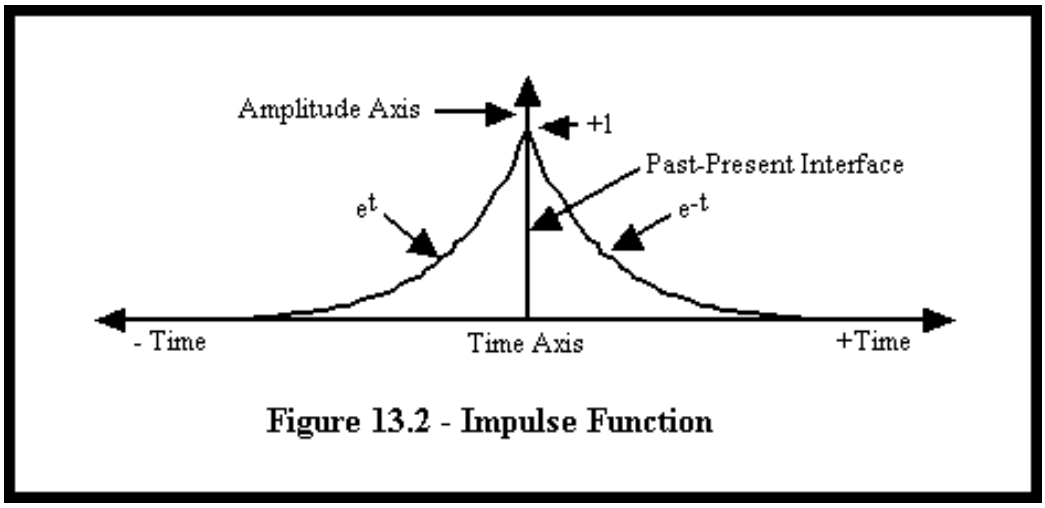


Figure 13.2 - Impulse Function

13.3- To describe how the photon meets these requirements, a mathematical device known as an impulse function, such as shown in Figure 13.2, is required. (There is a class of mathematical functions known as impulse functions. The one shown is the simplest and was therefore selected for the discussion which follows but it must be remembered that Nature may employ a different version in the photon.) Multiplying the electromagnetic wave of Figure 13.1 by an impulse function provides a suitable configuration for the photon, as shown in Figure 13.3. This configuration can travel through the Aether either by itself or, when grouped in a synchronized sequence, as an electromagnetic wave.

13.4- The energy content of a photon has been determined to be directly proportional to its frequency (inversely proportional to its time duration) with the constant of proportionality being equal to Planck's Constant. As a consequence, we may conclude that the amplitude of a photon's electric and magnetic vectors increases in proportion to the square root of its energy, in an manner

analogous to the storage of energy in a compressed spring (doubling the distance by which a spring is compressed also doubles the force in the spring and increases the energy stored in the spring by a factor of four). Figure 13.4 illustrates the vectors of two photons which differ in energy by a factor of two. The increased frequency of the higher energy photon corresponds to its having a time duration which is shorter than that of the lower energy photon.

13.5- There is another type of radiation which requires discussion, the radiation represented by neutrinos. Other than the facts that neutrinos lack electromagnetic properties, making them extremely difficult to observe, and they have never been observed to combine into a continuous wave, the neutrino seems to be of the same nature as the photon. It seems reasonable, therefore, to postulate the existence of neutrinic radiation which is akin to, and may actually be a form of electromagnetic radiation. Conceptually, however, propagation of the neutrino presents a difficulty which does not occur with the photon. Propagation of the photon requires the interchange of energy, phased 90 degrees apart, between two mutually perpendicular axes (the electric axis and the magnetic axis). While one might consider the neutrino to result from an impulse of mechanical stress in the Aether along one axis (e.g.- corresponding to the electric stress of the photon), the energy storage mechanism along the other axis (corresponding to the magnetic stress of the photon) is not apparent. However, neutrinos exist and that energy storage mechanism must also exist. In turn, analogous phenomena to those produced by photons and electromagnetic waves should be possible. The author would hope that the subject will be examined more extensively by others in the future.

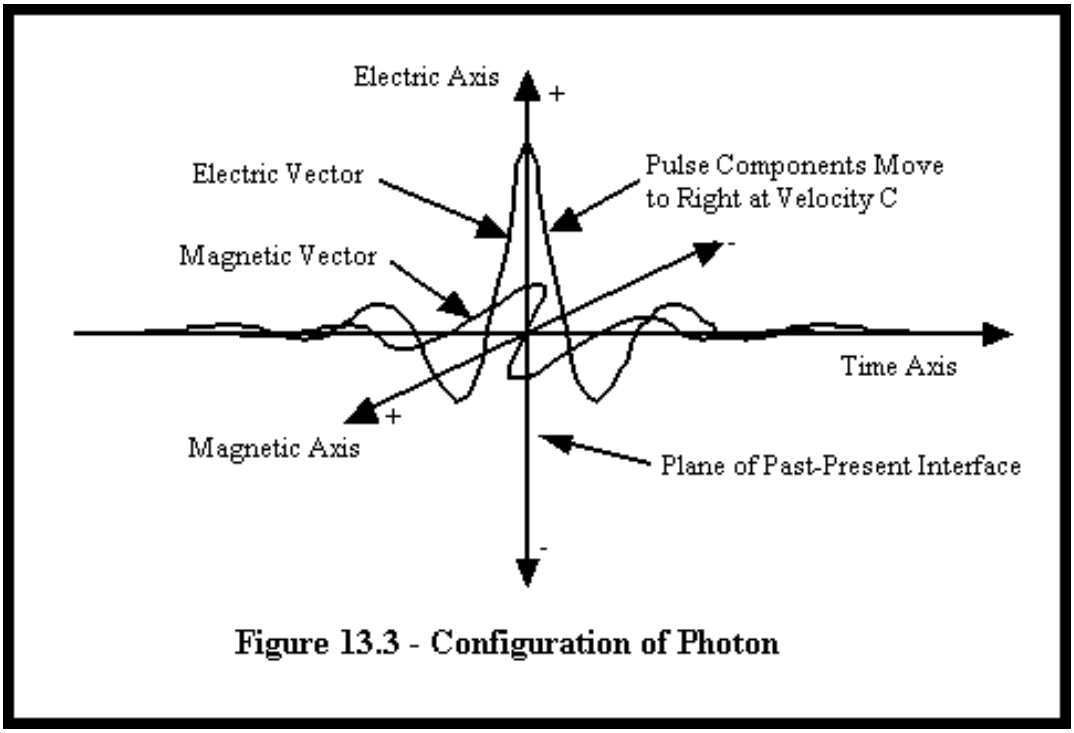


Figure 13.3 - Configuration of Photon

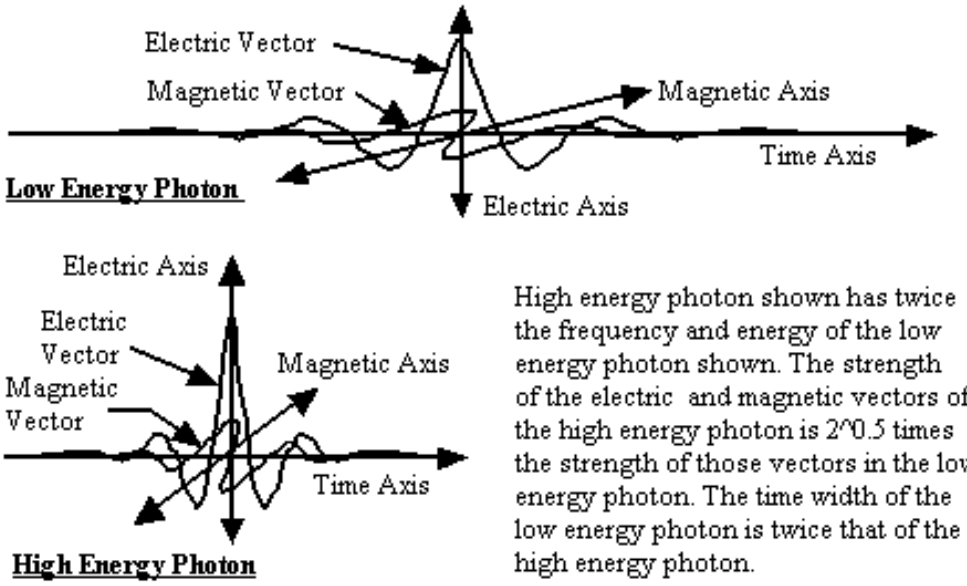


Figure 13.4 - Effect of Energy and/or Frequency on Photon

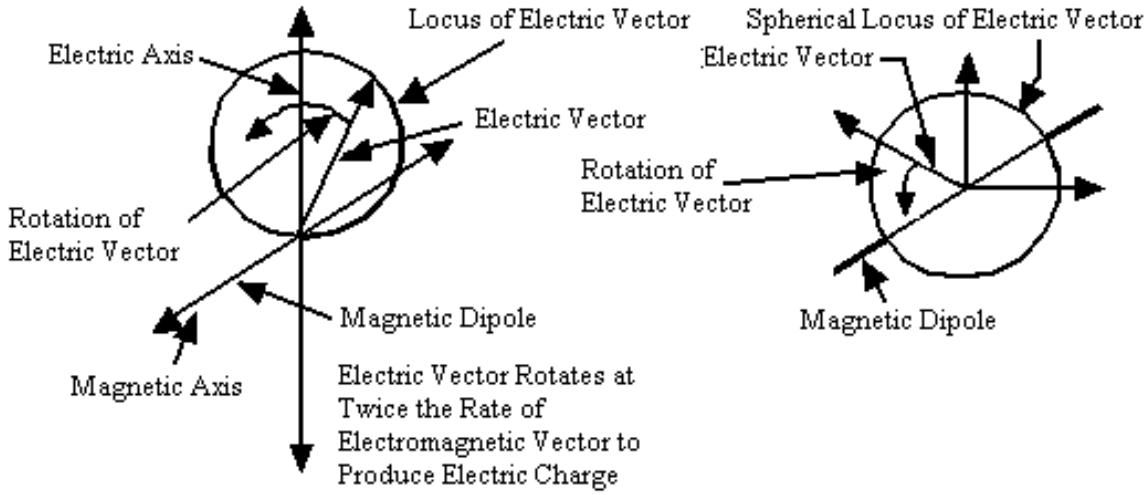
13.6- Implicit in the conclusion that solid matter cannot move through a solid Aether is the unproven assumption that solid matter is actually solid. Experiments in particle physics have shown that electrons and nudleons contain no detectable solid structure larger than the observational limit of 10^{-18} meters. This fact and the fact that matter can move effortlessly through a solid Aether require that the assumption that matter is solid be questioned. It is necessary to examine how, what appears to be a solid particle, may actually be a vibration traveling at the velocity of light and thus be capable of moving through the solid Aether as easily as photons or neutrinos. Since particles of matter exist when they are at rest or moving slowly, it would seem that such a possibility must be ruled out, but one must never ass*u*me. Solid matter could move at a low velocity and yet consist of a vibration traveling at the velocity of light if that vibration were traveling in a circle. For this to be the nature of solid matter, single or multiple cycles of radiation would have to be bent into a circular path with the ends joined to form a loop. Providing such loops contain an integral number of cycles, their vibrations will reinforce and there would seem to be no inherent reason why they could not persist indefinitely. Since the loops are vibrations, they are free to travel through the solid Aether at any velocity between the limits of +/-C as easily as photons or neutrinos. (As will be discussed later, these loops imply the existence of enormous local gravitational fields.) In additional, a process which changed the number of cycles contained in such a loop would result in the release or absorption of a photon(s) or a neutrino(s).

13.7- To an observer, such a loop of vibration would appear to be a material particle. If the loop is unstable, it will decay after a time and release some or all of its energy in the form of radiation with the remaining energy in the form of a lower energy particle(s). If the configuration of the loop is stable, barring a severe external disturbance, it will exist forever as a material particle. Of all of the observed solid particles, only electrons and protons and their anti-particles exhibit the stability required for infinite life. Neutrons are slightly unstable and decay into protons and electrons after a few minutes unless they are confined along with protons in the interiors of atomic nuclei. (Perhaps they should be classified, along with all other atomic and sub-atomic particles, as unstable configurations of radiation loops. A possible cause of the neutron's instability will be discussed later.)

13.8- To understand how such a loop of radiation might form a material particle, consider the implications involved in curling one cycle of the continuous electromagnetic wave shown in Figure

13.1 about its magnetic axis to form a loop, as shown in the left side of Figure 13.5. Curling of the single cycle of radiation results in the production of a fixed polarity electric vector rotating at twice the angular rate of the electric vector which formed the original electromagnetic wave. (Mathematically, the process is equivalent to squaring the expression for the electric amplitude vector, cos[w*t], to obtain 0.5+0.5*cos[2*w*t]. The presence of the term, 2*w*t, indicates that the frequency of the vector rotation has doubled.) As one would expect, the rotation of the electromagnetic wave about its magnetic axis produces a stationary magnetic dipole. It also produces a monopole electric charge because its electric vector is the square of the electric vector of the original electromagnetic wave and, being a squared term, does not change polarity. (As the cycle proceeds, the polarity of both the electric vector and its direction reverse every 180 degrees of the electromagnetic wave and the product of two negative terms is positive.) Positive unipole charges (electrons) would be produced by rotation about the magnetic axis at 0 degrees on the time axis. Negative unipole electric charges (positrons) would be produced by rotation about the magnetic axis at 180 degrees along the time axis.

13.9- It will be noticed that the resultant locus of the electric vectors in the left side of Figure 13.5 is lopsided. It seems likely that electrostatic repulsion would redistribute that locus into a spherical configuration and the magnetic dipole would move to the axis of the sphere, as shown in the right side of Figure 13.5. This configuration seems consistent with the properties of electrons and positrons in that the resultant particle consists of a point charge and a magnetic dipole and which repeats its original state after two rotations about its magnetic axis. The principle objection to the configuration would appear to be the fact that the curling of the electromagnetic wave into a loop requires a variation in the velocity of light along the electric axis such as the radial variation in the velocity of light shown in Figure 13.9. A variation in the velocity of light is not without precedent, the lenses of your eyes do exactly that in order to focus the light reflected from this page as you read it.



Curling of a single cycle of elctromagnetic radiation about the magnetic axis to form a closed loop generates a charged particle with a magnetic moment and which rotates at twice the rate of the particle's physical roatation. Curling about the magnetic axis at zero degrees generates a positron. Curling about the magnetic axis at 180 degrees generates an electron. Configuration at left should not be stable and repulsion between electric vectors having same polarity should cause their locus to bbe spherical. Configuration at right would then represent positron or electron as a small charged volume with a magnetic dipole.

Figure 13.5 - Configuration of Charged Particle

13.10- The concept that matter consists of radiation loops can be subjected to a reasonableness test by examining the known size and energy content of the nucleon since the size and energy content of particles formed of radiation loops must be consistent. The radius, r, of a cycle of radiation having an energy of e, in terms of Planck's Constant, h, and the velocity of light, C, is given by r=h*C/[2*(PI)*e]. Scattering observations have shown that nucleons (protons and neutrons) contain three inseparable internal entities named quarks. Apportioning the energy of the nucleon, about $1.503*10^{-10}$ joules, equally among the three quarks leads one to the conclusion that their radii are $6.315*10^{-16}$ meters, or 63% of the observed radius of the nucleon. This is an interesting percentage because it is equal to 1-1/e", a function which appears frequently in electromagnetic equations. (In this expression, e" represents natural number similar to PI having a value of 2.718.) It would appear that the radius of the nucleon is determined by the radius of a loop of radiation having the energy of a single quark. Since the nucleon differs greatly from the electron and it is neutrinos which are emitted and absorbed by processes which are associated with nucleons, one is led to the supposition that the quark is a loop of neutrinic radiation. (Applying this line of reasoning to the electron provides its radius as $3.9*10^{-13}$ meters. This size seems to be consistent with its behavior within atoms.)

13.11- If energy is added to a particle consisting of a loop of radiation, one would expect the wavelength of the radiation composing the particle, and therefore its radius, to reduce because the energy of the particle is Planck's Constant divided by its wavelength, as illustrated by the difference between the low energy particle of Figure 13.6A and the high energy particle of Figure 13.6B. However, if the diameter of a particle is prevented from becoming smaller, it has the alternative of absorbing discrete packets of energy by increasing the number of cycles it contains and/or by absorbing unquantified energy by increasing the velocity of light within the loop (hypothetical possibility for further consideration). These alternatives are illustrated by the difference between the low energy particle of Figure 13.6A and the high energy particle of Figure 13.6C. The significance of these possibilities will become apparent shortly. Recent experimental observations have shown that, like electrons, quarks are also devoid of an internal structure down to the observation limit of 10^{-18} meters. These observations are consistent with the view of the quark described in this Chapter and the requirements of a solid Aether.

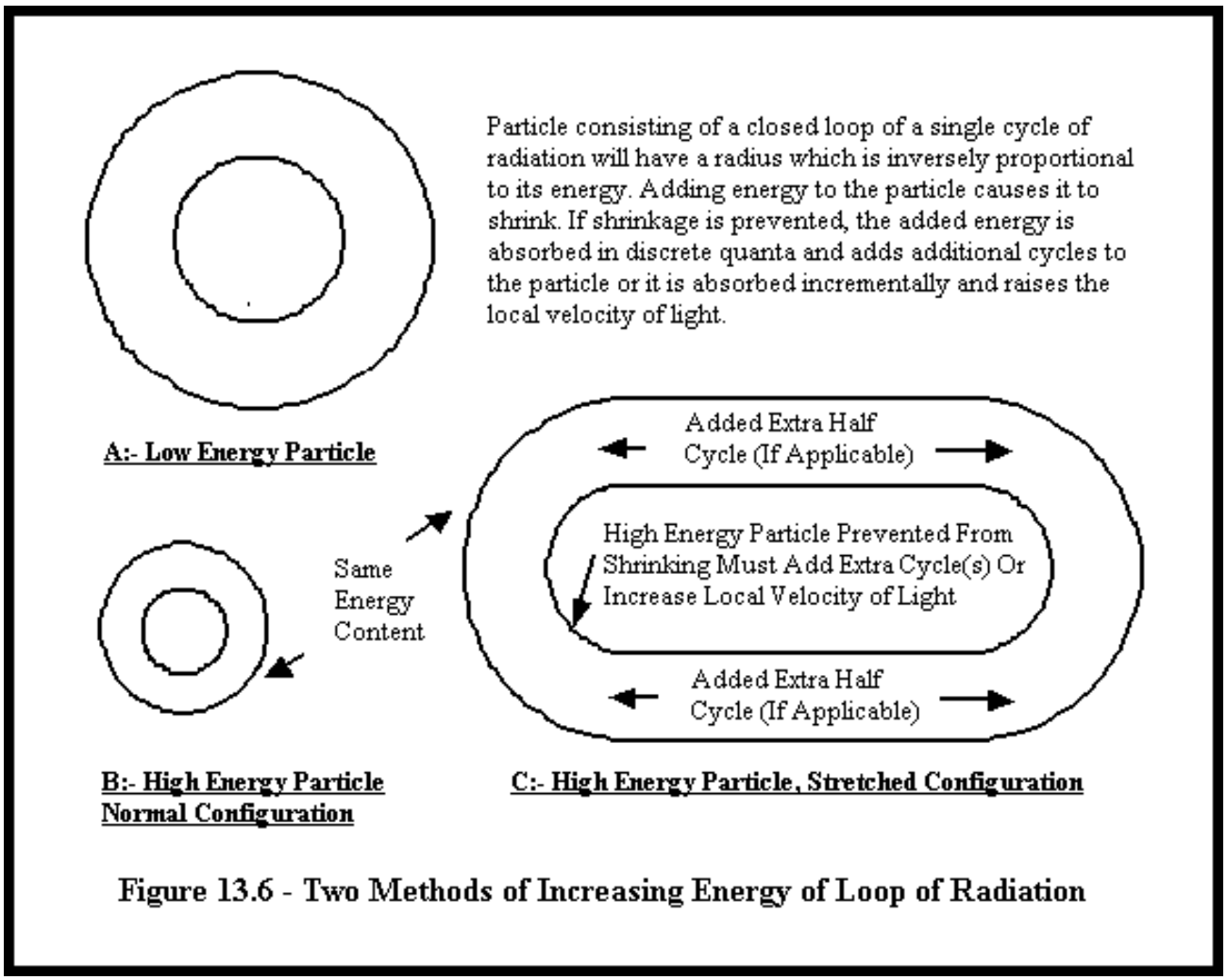


Figure 13.6 - Two Methods of Increasing Energy of Loop of Radiation

13.12- Quarks have an interesting property. They are sociable and cannot be separated. They exist permanently only in groups of three to form the structure of nucleons and they exist temporarily either separately or in pairs (pions and kaons) as the short lived debris products of high energy nuclear collisions. Attempts to separate quarks from the nucleon are extremely difficult because, when quarks are in close proximity the force holding them close together is small but is reported to increase rapidly to a constant level, independent of the separation, as they are moved apart.

13.13- If one compares the size of a quark with the size of a nucleon, it would seem to be impossible that three quarks could fit within it, unless of course, their loops are intertwined. This possibility brings to mind the logo of a popular beer which consists of three intertwined circles (Figure 13.7). If the quarks in a nucleon are intertwined in loops analogous to that logo, the attractive force between them will behave in the manner ascribed to the strong force defined by particle physicists. When the loops in the logo configuration are nearly centered on each other, virtually no forces are exerted between them. If energy is added to such loops of radiation, one would expect their intertwining to prevent them from absorbing that energy by reducing their size because there is no room in the center to permit shrinkage. The loops composing the quarks in a nucleon would then have to absorb any extra energy in another manner. Their options would seem to be to incorporate the addition of extra cycles and/or increase the velocity of light within one or more of the loops. Both these possibilities suggest that the force required to stretch a quark would be independent of the distance it is stretched and this is what seems to be observed, as illustrated by Figure 13.8.

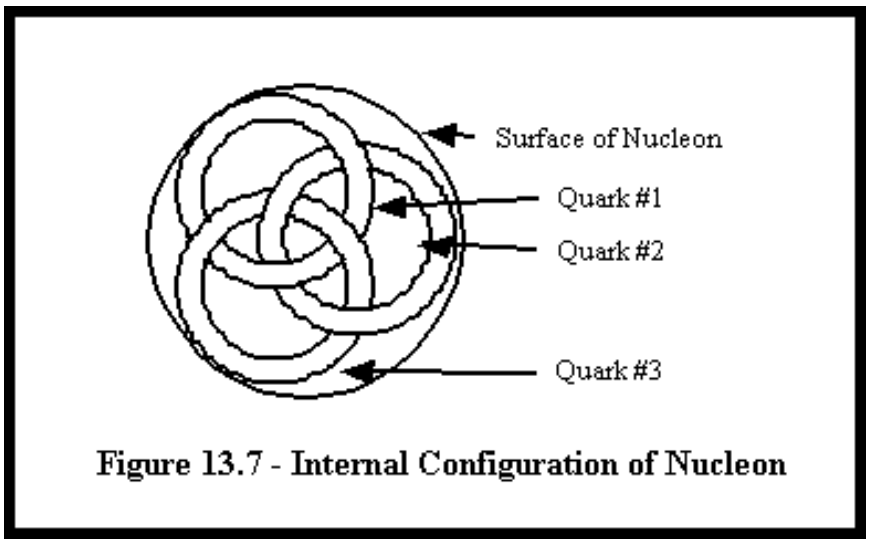


Figure 13.7 - Internal Configuration of Nucleon

13.14- Conventional particle physics ascribes the attraction between the three quarks which form nucleons or the two quarks which form pions and kaons to the action of extremely massive and short lived virtual exchange particles named gluons without any explanation as to how such particles can produce attractive forces. With the configuration described above, the forces between quarks in nucleons, pions, and kaons would result from their topological configuration and the strength of their radiation loops. The massive gluons of theoretical particle physics not only would be unnecessary, they cannot exist within the nucleon without causing the nucleon to be considerably more massive than it is. The only force required to explain the behavior of the intertwined quarks is the tensile strength of the radiation loops of which quarks are composed and the intense gravitational attraction caused by the slowing of the velocity of light within them, as discussed below.

13.15- Protons (or anti-protons) within an atomic nucleus repel each other as a result of electrostatic force acting between like charges. At the distance represented by the size of the nucleon, the level of that force is on the order of 17 pounds. This force is about 10^{40} times as large as the attractive force between the gravitational masses of nucleons as predicted by Newton's Law of Gravitation. Obviously, protons (or anti-protons) in the nucleus of an atom cannot be held together by gravitation. Again it must be repeated, never ass*u*me. As has been shown earlier, the force we experience as gravity results from a gradient in the velocity of light existing as a function of elevation. In order for the quark or the electron to exist as a loop of radiation, it is necessary for the velocity of light within the quark or electron to reduce linearly from its nominal value of C at its periphery to a value of zero at its center, as shown in Figure 13.9 for the quark. In the quark, the gradient in the velocity of light is enormous, and, at its periphery, the author estimates the Newtonian force of gravity acting on the mass of a nucleon as a result of this gradient to be on the order of 11 million pounds. While the simplistic representation of Figure 13.9 suggests that the gradient abruptly falls to zero at the surface of the quark, experience with fields suggests that such cannot be the case. The gradient must decrease smoothly towards the conventional gravitational gradient level in the vicinity of the quark's surface. It is not difficult to believe that enough residual gravitational attraction exists between the quarks in nucleons to overcome the relatively puny electrostatic force which attempts to separate protons or anti-protons and, when nucleons are in close proximity, they should be extremely sticky. (This is the type of question that physicists trained by rote handle extremely well and the author hopes that a few of them will be sufficiently antagonized to examine this conjecture even if their only motivation is to prove it foolish.) With this interpretation of the nature of the nucleon, the electroweak and electrostrong forces postulated by particle physicists are not only unnecessary but are impossible.

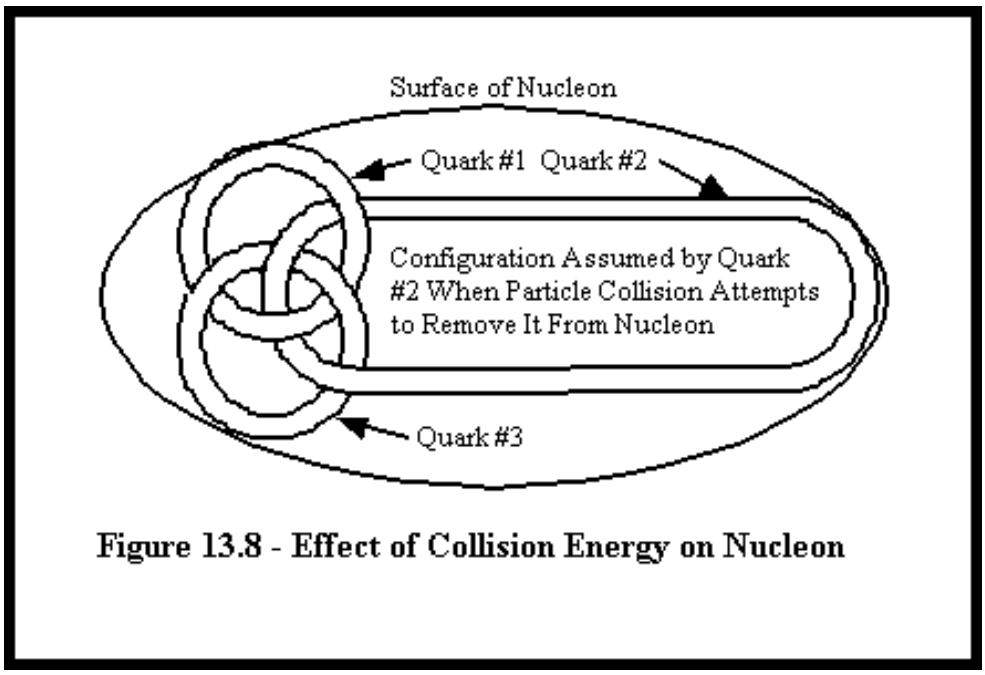


Figure 13.8 - Effect of Collision Energy on Nucleon

13.16- The size of the electron should not be confused with the size of its orbit in an atom. The circumference of that orbit is the wavelength determined by the orbital kinetic energy of that electron. Quantum Mechanics imposes an additional restriction on its size. The circumference of the orbit must contain an integral number of cycles of radiation and the total energy of those cycles must equal the energy of that orbit. As a result, the electrons in an atom are confined to discrete orbits which can change only as a result of a change in the number of cycles contained in them. That change in the number of cycles requires the absorption or emission of a photon of electromagnetic radiation of exactly the correct energy level (wavelength). Diagrammatically, the effect is identical with that shown in the illustrations of Figures 13.6A and 13.6C.

13.17- It appears that, for the loops of radiation which comprise matter to be stable, the presence of charge of either polarity is required. As mentioned, electrons and protons are stable on their own while neutrons are stable only in the proximity of a proton's charge. This is not an unreasonable result. The electric charge of the proton is repulsive and would act to expand the radius of the quark loops. At a larger radius, these loops contain less energy and would allow a neutron to reduce its internal energy by expelling an electron to become a proton. Apparently, this process is restrained in the neutron by the proximity of a proton, and in atomic nuclei, neutrons and protons seem to perform a symbiotic function. The positive charges of the protons prevents neutrons from decaying by emitting electrons to become protons while the extremely strong gravitational attraction between neutrons and protons resulting from the effects implied by Figure 13.9 prevents the mutual repulsion of the proton's charges from destroying atomic nuclei by causing them to fly apart. One might conclude then that the stability of the various atomic nuclei is determined by the parameters of this nuclear symbiosis for each particular atomic weight and number. (The preceding description also applies to anti-particles.)

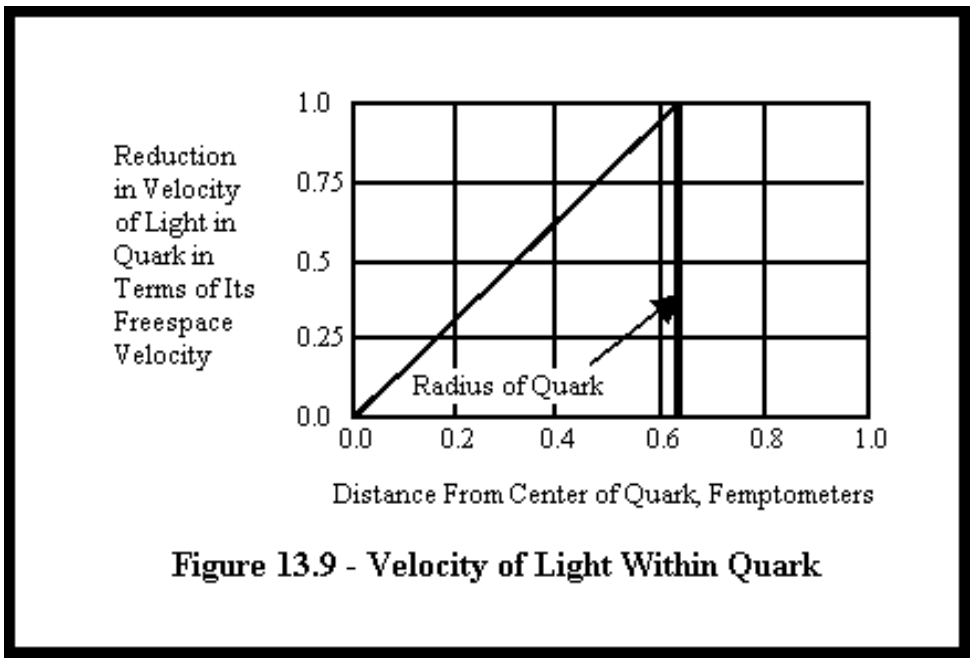


Figure 13.9 - Velocity of Light Within Quark

13.18- With the interior of nucleons observed to contain three quarks of a size and aggregate mass equivalent energy essentially equal to the mass equivalent energy of nucleons, the question as to whether quarks are fundamental particles or whether they have an internal structure of their own is readily answered. Since quantum mechanics teaches that the size of a particle is inversely proportional to its energy equivalent mass, it follows that quarks are fundamental and do not contain an internal structure. If the quark consisted of more than one particle, the mass equivalent energy of each of those particles would either be proportionally smaller than that of the quark and, as a result, they would be larger than both the quark and the nucleon which contained them, an obvious absurdity. Alternatively, if the quark were composed of multiple particles small enough to fit in the space available, the mass equivalent energy of both the quark and the nucleon which contained it would be larger than their observed values, again an obvious absurdity. Even in the microscopic quantum world, blivits are impossible. (A blivit is defined as two pounds of excrement in a one pound bag.) The short lived high energy particles created in nuclear explosions and collision experiments are consistent with the interpretation that they are loops of radiation of high energy content either because they are single cycle loops which have been compressed into a smaller radii and/or have become larger by incorporating additional cycles into their loops or by locally increasing the velocity of light. It would seem reasonable to expect such particles to be unstable and to decay rapidly. *There is no stable structure in Nature which is smaller or more massive than the quark or the nucleon in which it is contained.*

13.19- The experimental activity in particle physics consists of bombarding particles with other particles at high energies and examining the debris resulting from the collision. This type of experiment is performed, not because of its innate relevance, but because it the only means currently available. In order for such an experiment to provide the desired resolution, it is necessary to generate collisions between particles, at least one of which has a kinetic energy which is large compared to the rest mass equivalent energies of the particles. These experiments yield a large number of short lived particles. Many of those particles have mass equivalent energies which are larger (sometimes by a factor of over 500) than the mass equivalent energy of the quark within the nucleon under test. Those particles are conventional particles whose energies have been increased by the process shown in Figures 13.6A and 13.6B or higher energy particles which temporarily form from the excess energy provided by the collision. Such particles apparently cannot be stable and they decay quickly into combinations of the stable particles (electrons, photons, neutrinos, nucleons and their anti-particles). Particle physics experiments involving energies large compared to the mass equivalent energy of quarks may be about as meaningful in determining the nature of matter as an experiment which attempts to determine the nature of fine crystal goblets by shattering them with rifle bullets and studying the fragments while they are in flight. It would appear that what

is really under test in high energy particle experiments is the ability of high energy radiation loops to form within the Aether and the stability of those loops.

13.20- The computer program used to evaluate gravitational contraction showed that the maximum internally observed energy density of an object undergoing gravitational collapse is about 10^5 times the energy density of a nucleon. Since this energy density ratio is of the same order as the collision energy to be attained in the now canceled Superconducting Supercollider Program, it might have been hoped that experiments performed on that machine would have revealed information about conditions which existed at our Universe's beginning. But, if the machine had been built, the information it would have provided would probably not be relevant to cosmology. The high energy content imposed on nucleons at the beginning of our Universe resulted from compression while the collision energy of particles produced by the Supercollider produces tension within the particle products. The effects of tension and compression are not the same. The tensile strength of ball bearing steel is on the order of 250,000 pounds per square inch (PSI). The ultimate strength of that steel under the type of compression occurring in bearings is several million PSI! When compression failure (brinelling) does occur in such a bearing, it results from tensile stresses induced by the compression in the region around the area of contact and not from the compression stress itself. Since compression and tension do not produce equivalent results in ordinary mechanics it is hard to justify a belief that they produce equivalent results in particle physics.

Chapter 14 - Adding Quantum Effects to Our Understanding

14.1- The Two Slit Experiment:- There is a classic experiment which leads to one of two interpretations, both of which appear absurd, and which have led to two mutually exclusive schools of thought. Under one interpretation every particle of energy continuously and instantaneously tests all of space to determine the path it should follow and its ultimate destination. Under the other interpretation, every particle in the Universe follows every possible path to every possible destination and furthermore repeats this process at every intnt of time since the Universe began. In so doing each of these possible paths creates an alternate universe with the Universe we observe as one of a quasi-infinite number of Parallel Universes. Each of those Parallel Universes is as complex as our own, each occupies the same volume of space as our own, and each represents the results of all of the decisions made by particles since time began. While there is a considerable number of physicists who ascribe to the latter viewpoint, it suffers from objections more significant than its quasi-infinite complexity. The creation of each of those alternate Parallel Universes requires the creation, from nothingness, of an amount of energy equal to the energy content of our own Universe and requires them to co-exist in the same volume of space. The trashing, to such a degree, of both the Law of Conservation of Energy and the requirement that no more than one object occupy the same space at the same time suggests a degree of foolishness on the part of those who hold this viewpoint, particular since no justification not involving some form of mysticism has ever been offered. On the other hand, the idea of a what might be defined as a quantum stress field continuously testing all of space and controlling the paths of particles does not violate accepted physical laws and allows a reasonable explanation for the results of the Two Slit Experiment and for the behavior of polarized light.

14.2- When a particle (e.g.- photon, nucleon, etc.) passes through an opening, its direction is altered by diffraction through an angle which is inversely proportional to the size of the opening as compared to the wavelength of the particle (Planck's Constant divided by the energy of the particle). When particles pass through a slit, the angle of their diffraction in a direction perpendicular to the slit is large compared to their angle of diffraction in a direction parallel to the slit and its use allows diffraction to be studied as a one dimensional problem. The Two Slit Experiment is illustrated in

Figure 14.1. Figure 14.2, and Figure 14.3. In this experiment, a beam of particles, such as electrons or photons, strike a mask which contains two slits. Particles passing through these slits are diffracted and are distributed in a diffraction pattern as they strike the screen. The relative rate at which the particles strike the screen, as a function of position behind a mask with a single slit, is illustrated by the diffraction pattern shown in Figure 14.1. If the mask contains two slits, one would expect the diffraction pattern at the screen to be the sum of the individual diffraction patterns of each slit, as illustrated in Figure 14.2. Instead, the actual diffraction pattern which results is that shown in Figure 14.3. Furthermore, this diffraction pattern persists as the long term distribution of the particles striking the screen even if the the possibility of interaction between particles is precluded by reducing the rate of particle flux to a level where there is not more than one particle in transit at a time.

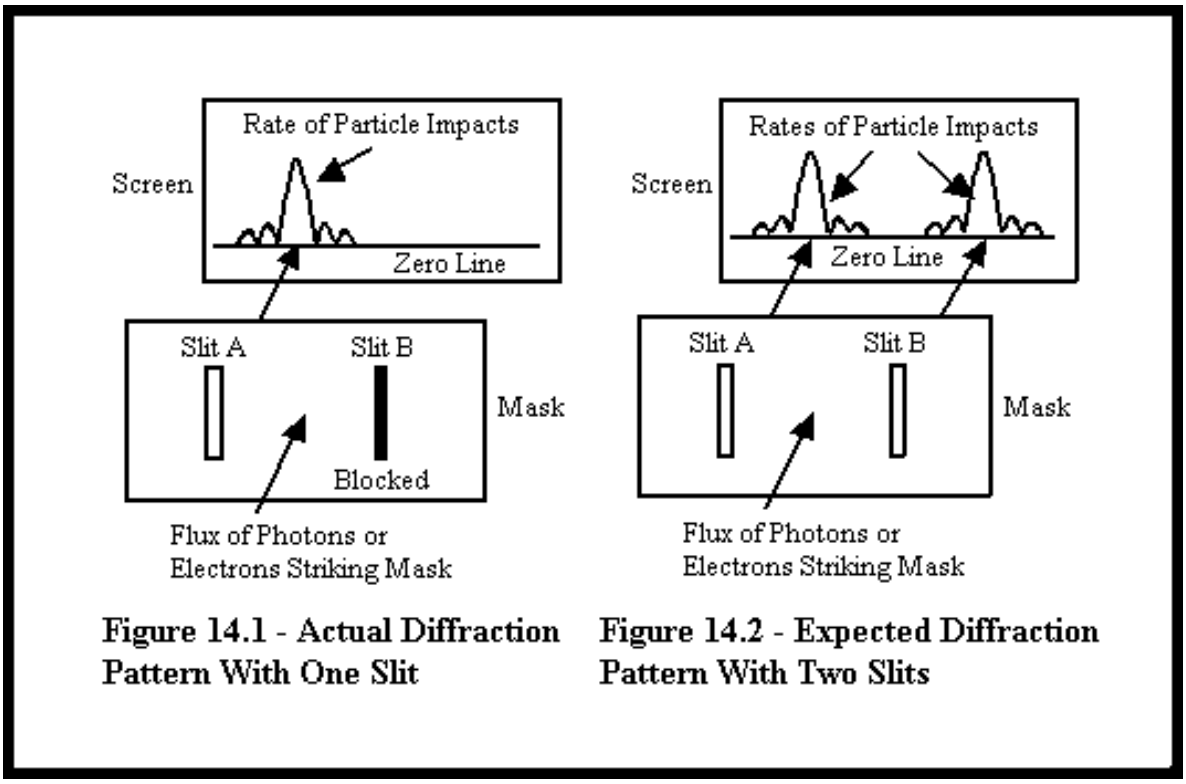


Figure 14.1 - Actual Diffraction Pattern With One Slit

Figure 14.2 - Expected Diffraction Pattern With Two Slits

14.3- The observations described in the preceding paragraph lead to the conclusion, apparently accepted by a significant number of quantum physicists (and the author as well), that somehow, while energy exists in discrete localized packets, the path which those packets follow as they move from point to point is determined by a continuous field propagating throughout all of space at a quasi-infinite velocity. That field, which the author designates for convenience as the Quantum Field, tests the probability of each of the possible paths of each and every particle in the Universe and causes those particles to adjust their paths so that their statistical distribution produces the diffraction patterns characteristic of waves. (The Quantum Field is not directly observable, it is only recognizable by its effects on the behavior of particles.) The author came to this conclusion in the 1980's after reading a book based upon a series of four lectures given by Dr. Richard Feynmann on the subject of Quantum Electrodynamics. His description of the process that determines the path that photons take when they travel from point A, are reflected from a mirror, and arrive at point B, led to what seems to be an obvious conclusion. For Nature to behave in accordance with the concepts of Quantum Electrodynamics, two requirements must be met. There must be an absolute velocity reference frame (i.e:- the Aether) and the photons must be capable of testing the probability of all of the possible paths between A and B virtually instantaneously and adjusting their paths accordingly while en route. Since Quantum Electrodynamics has been the most successful concept ever devised in its ability to accurately predict the results of experiments, it would seem that the concept of a continuous Quantum Field propagating at a quasi-infinite velocity has been observationally verified and the concept of the all pervading Aether has been re-verified.

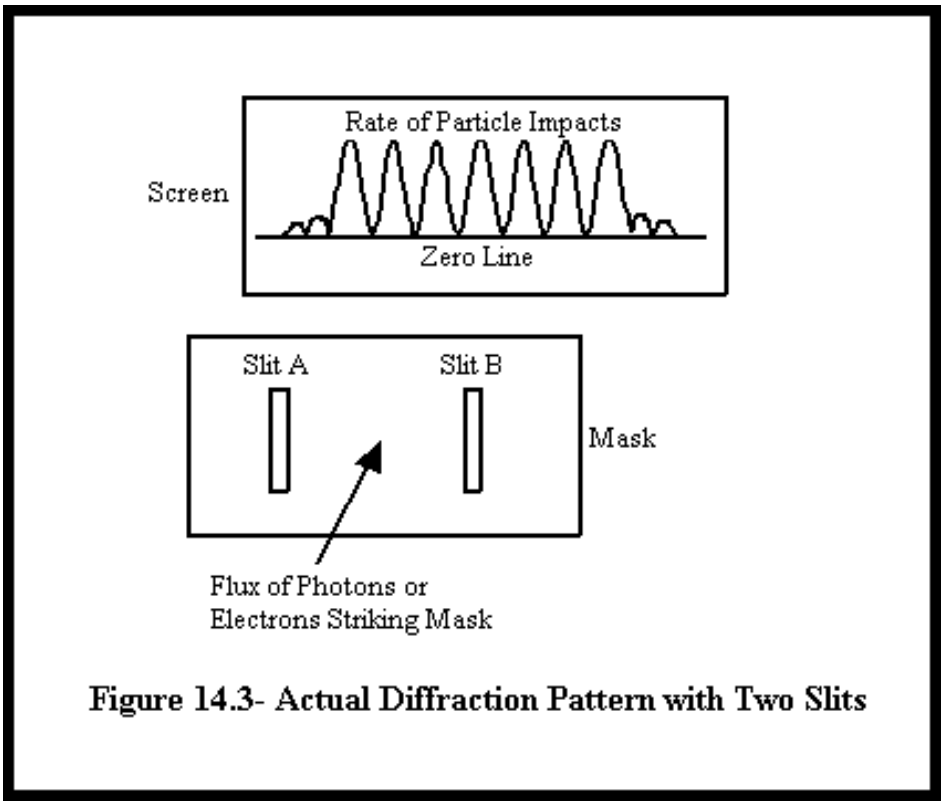


Figure 14.3- Actual Diffraction Pattern with Two Slits

14.4- It is quite certain that the scientific community will not accept the material in Dr. Feynmann's book as evidence of the existence of the Quantum Field or of the Aether. Their record in recognizing the obvious is rather poor. Acceptance of new knowledge by any group requires that the knowledge be made obvious to the group's least intelligent member in a manner which does not require that member to face up to his inadequacy. One need only note the derision heaped upon Dr. Wigner in the early part of this century for suggesting that the matching continental shapes, geology, flora, and fauna of South America and Africa proved that they were once part of a common continent. When the author first read of Dr. Wigner's conclusions as a pre-High School student in the late 1930's he found it incredible that anyone could look at the continental shapes and not recognize the obvious validity of Dr. Wigner's ideas. It seemed to him that the only legitimate question remaining was how the continental separation could have come about. Acceptance of Wigner's Continental Drift concept should not have had to await the discovery of the lines of reversed magnetic polarization alongside of a central rift in the ocean's floor. Once Dr. Wigner's ideas had become known, the concept of tectonic plates should have been immediately obvious to any one in the field who was aware of the fact that the core of the Earth was molten and covered with a thin solid crust. It would seem that, in this case, the performance of the academic establishment left something to be desired. The same comment can be made regarding the difficulties that Dr. Shoemaker had in gaining acceptance of the idea that the Earth is periodically bombarded with very large rocks from space. It had already been accepted that rocks of all sizes orbit the Sun and that smaller rocks fall from the sky continuously as meteorites. One would have to be pretty simple minded if he looked at a picture of the Barringer Crater and did not recognize that it could only have been caused by the impact of one of the large space rocks (asteroids or comets) known to exist. The observation of a comet striking Jupiter should have been frosting on the cake, but as a verification of the certainty of periodic asteroid strikes on the Earth, it should have been considered trivial.

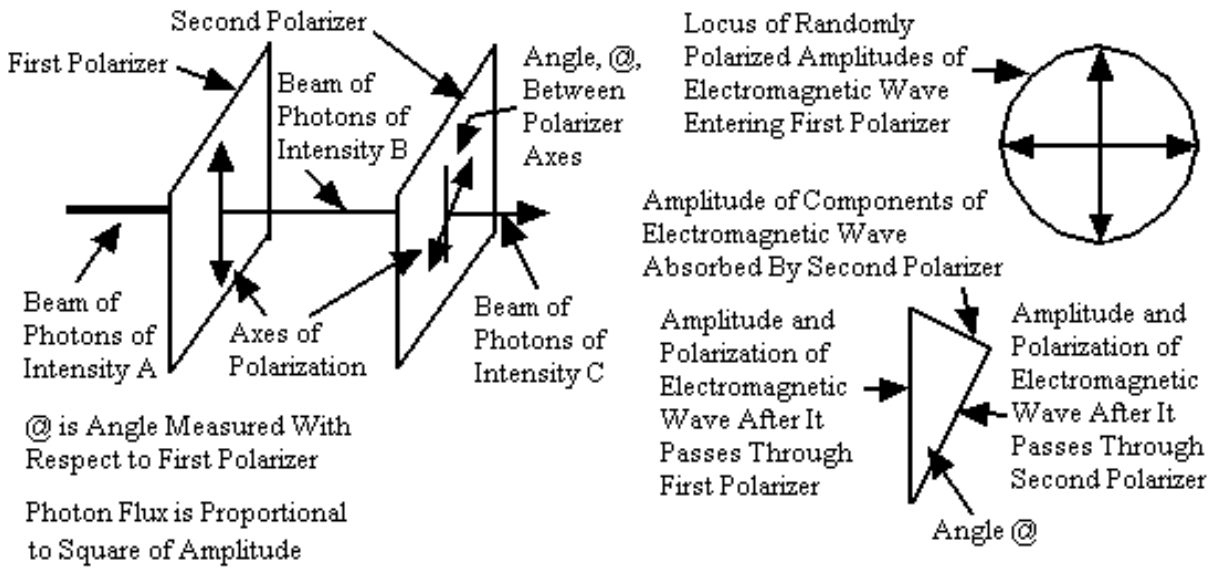


Figure 14.4 - Electromagnetic Wave and/or Beam of Photons Passing Through Polarizers

14.5- The experimentally validated concepts of quantum mechanics yield information which, as did the relativity concepts, modify classical Newtonian Physics. These modifications involve the sub-microscopic world. The modifications of interest to this discussion are provided below:

- **In its observable form, energy is not continuous. It appears only in the form of discrete packets which may be photons, neutrinos, protons, neutrons, or their anti-particles, and which are designated as quanta.**
- **Each quanta, whether it be a photon, a neutrino, or a material particle, has a frequency equal to its energy content divided by Planck's Constant.**
- **Each quanta couples to the Aether. Any quantum stress induced in the Aether by that coupling pervades all of space at a quasi-infinite velocity and probably obeys the inverse square law with respect to distance.**
- **Some quanta, such as photons which have been created in pairs, have quantum numbers (the axis of polarization in the case of photons) which are permanently coupled. This coupling is infinitely stiff, virtually instantaneous, and is unaffected by the distance between the paired particles.**
- **Information as to the state and position of each quanta is transported at a quasi-infinite velocity and with infinite resolution by quantum stress in the Aether.**
    - **The stress pattern in the Quantum Field at any point in space is modified by the configuration of obstacles in the path of the particles producing the stress.**
- **Particles in motion follow a path which is consistent with the path of the information transported at a quasi-infinite velocity by the stress in the Quantum Field.**

- **Since the Quantum Field is continuous and the particle is quanticized, the transport of information by the two effects cannot match on an instant by instant basis. The match becomes proportionately more precise when the number of particles observed becomes large enough to allow their positions to be a statistically accurate representation of the information represented by the stress in the Quantum Field. The instantaneous peak to peak error in the information match is equal to the energy of the quanta.**

14.6- The Behavior of Polarized Light:- The wave-particle duality of nucleons, photons and neutrinos revealed by the Two Slit Experiment is probably most easily understood by considering the effect of polarizers on a beam of light. As shown in Figure 14.4, a beam of electromagnetic radiation (light) is directed through a pair of polarizers having their polarizing axes at an angle @ with respect to each other. The beam of light entering the first polarizer from the left is unpolarized. While the polarization of each photon in the entering beam is at a random angle, providing the entering electromagnetic wave is sufficiently intense, its intensity is independent of direction, as shown by the circular locus diagram in Figure 14.4. When the electromagnetic wave passes though the first polarizer, the randomly polarized input wave is organized into a vertically polarized wave, as shown by the vertical component in the vector diagram of Figure 14.4, with an intensity of $1/2^{0.5}$ times the intensity of the incoming wave. That single vertical polarization vector may be considered to be the vector sum of two orthogonal components. One of those components is parallel to the axis of the second polarizer while the other component is perpendicular to that axis. As one would expect, the second polarizer will pass only the parallel component. With the loss of the orthogonal component, the relative intensity between the electromagnetic wave leaving the second polarizer, as compared to the intensity of the wave leaving the first polarizer, is further reduced in proportion to the magnitude of the cosine of the angle between the polarizers. The polarizing process and the preceding analysis may be repeated as often as desired in a series of successive polarizers. A monochromatic electromagnetic wave actually consists of a flow of photons having the same total energy, and the intensity of the wave is proportional to the square root of its energy. As a consequence, the photon flux associated with each of the intensity vectors described varies in proportion to the square of that intensity vector and its polarization is identical to the polarization of the equivalent wave, as shown in Figure 14.5.

14.7- It is both customary and somewhat incorrect to consider that the rate of arrival and the axis of polarization of photons comprising an electromagnetic wave are random. In a monochromatic electromagnetic wave of unchanging intensity, the average rate of arrival of photons is constant. Their instantaneous rate of arrival, however, is a random variation about that average rate. Similarly, if the electromagnetic wave is unpolarized, the average axes of polarization of its photons are uniformly distributed, while their instantaneous angles of polarization are random. If an electromagnetic wave is polarized, both its intensity and the average rate of arrival of its photons vary as a function of their angle with respect to the axis of polarization, as shown in Figure 14.6, and both the instantaneous rate of arrival of the photons and the variation of their axes of polarization are random. In addition, because the intensity of the electromagnetic wave and the distribution of photons are defined by cosine and cosine^2 functions respectively, the effect of cascading polarizers may be predicted by multiplication of the effects defined by Figure 14.6 for each polarizer in the chain. [Since the relative randomness of N events varies in proportion to $1/(2*N)^{0.5}$, the random arrival and polarization of photons in electromagnetic waves is insignificant unless the intensity of the wave is low.]

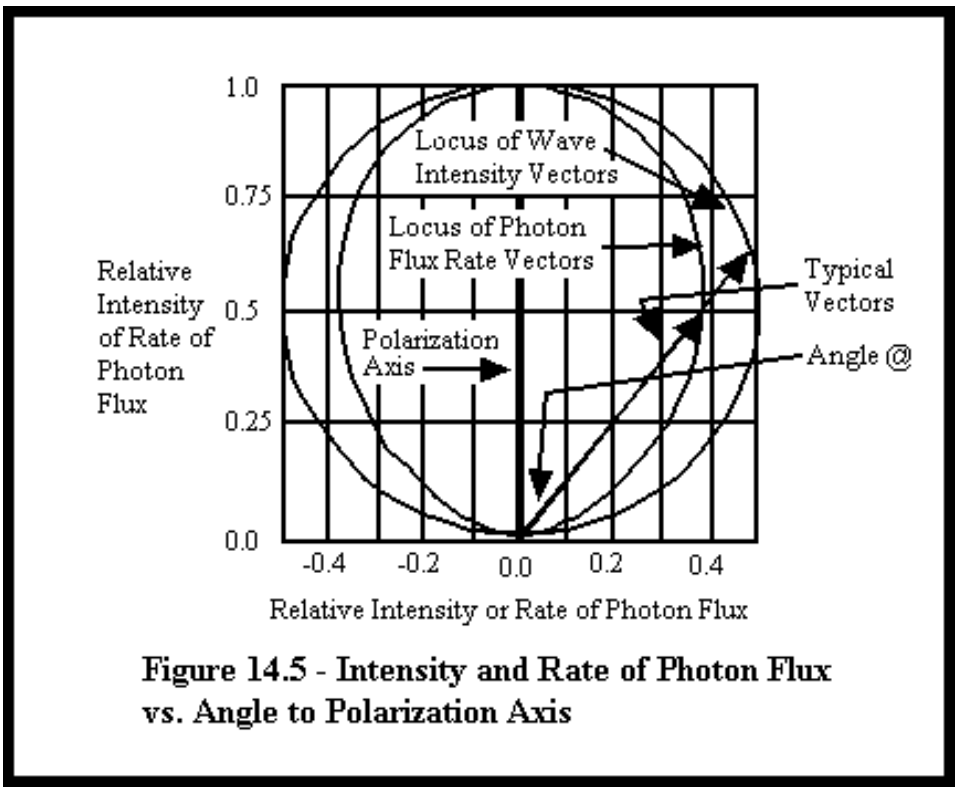


Figure 14.5 - Intensity and Rate of Photon Flux vs. Angle to Polarization Axis

14.8- Understanding the Quantum Nature of Energy:- The instantaneous time of arrival of photons and their polarizations are individual events which apparently occur at random, yet somehow, in the aggregate, they are organized in an accurate pattern. This is a reasonable result for an unpolarized electromagnetic wave because it can occur by pure chance. This easy answer does not explain the rate of arrival and angle of polarization of photons which comprise a polarized electromagnetic wave. Those photons are organized and that organization requires the action of an organizing mechanism. To understand the characteristics of that mechanism, a brief detour into the operation of a device currently used in digital audio systems is useful.

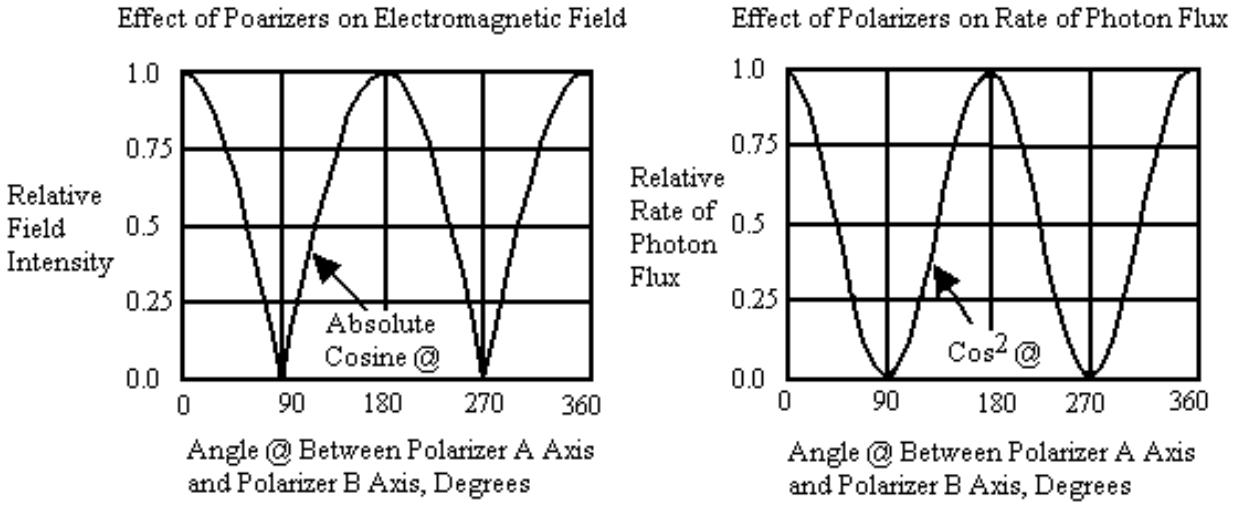


Figure 14.6 - Effect of Pair of Polarizers Crossed at Angle @ on Field Intensity and Photon Flux From Unpolarized Light Source

14.9- The device of interest is the Sigma-Delta analog to digital converter used for digital signal

processing in audio systems. It converts the varying analog audio signal provided by a source (microphone, tape deck, etc.) into a pseudo-random string of digital bits which is subsequently decoded to form digital words corresponding to the analog amplitude of the incoming signal. (See Figure 14.7.) The input portion of the circuitry can be considered to be a simple integrator consisting of an amplifier, a feedback capacitor, and a resistor in series with its input. The output voltage of such a circuit changes at a rate which is proportional to the voltage applied to that input. The input to the integrator is the average value of the output of the SPDT switch subtracted from the input signal. Since the switch is driven by a clocked flip-flop in response to the polarity of the amplifier output and the state of the flip-flop is determined by the output of the amplifier, the average value of the pulse train driving the switch must equal the average value of the analog input signal. By combining the switch drive signal with the clock signal in an and-gate, a digital pulse train results whose average level accurately represents the low frequency spectrum of the analog input signal. Superimposed on this low frequency output is a noise at the clock frequency having an amplitude of one clock pulse. The device converts an analog signal, analogous to a quantum stress in the Aether, into to a quasi-random sequence of standardized pulses, analogous to the quanta represented by discrete particles.

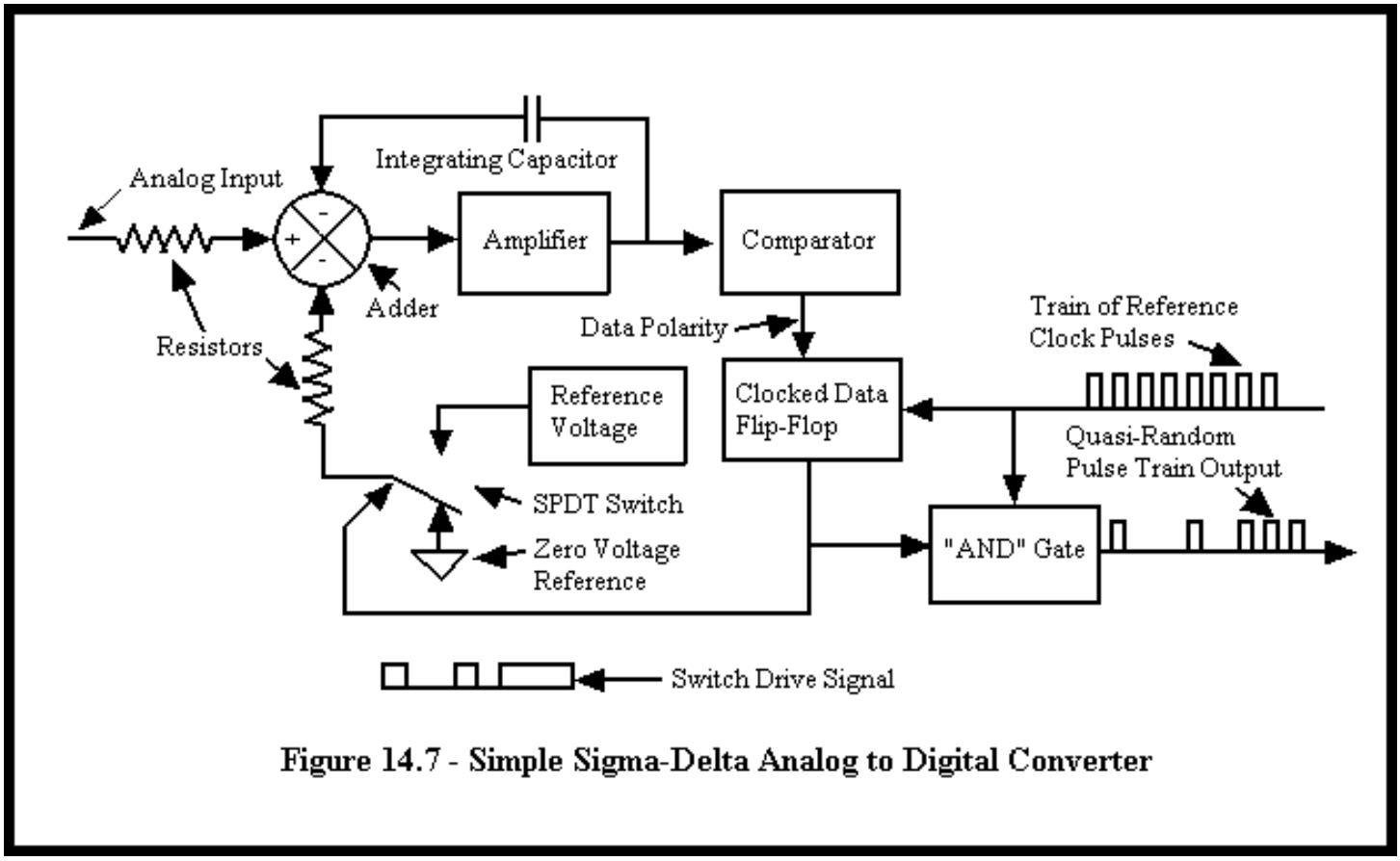


Figure 14.7 - Simple Sigma-Delta Analog to Digital Converter

14.10- In order for the Sigma-Delta converter analogy to apply satisfactorily to the Two Slit Experiment, the conditions tabulated below must be met:

- **Each quanta must apply a quantum stress to the Aether.**
- **Quantum stress in the Aether must propagate in all directions at a quasi-infinite velocity.**
- **Quantum stress in the Aether probably must obey the inverse square law.**
- **Quantum stress in the Aether must be refracted by the geometrical configuration of matter.**

- **The quantum stresses imposed on the Aether by multiple quanta located throughout all of space must superimpose to produce a single quantum stress level at any given point.**

- **A quanta moving in a free trajectory follows a path consistent with the diffraction pattern of the quantum stress it generates in the Aether.**

    - **Since a quanta represents a discrete amount of energy while its contribution to the stress level in the Aether is continuous, the path of a particle cannot follow its diffraction pattern in the Aether exactly. A residual quantum stress level remains after the arrival of each particle.**

    - **The Aether minimizes its residual quantum stress level by adjusting the paths of subsequent particles to produce the observed diffraction pattern in the rate of particle arrival.**

- **Since the localized stress in the Aether results from the superposition of all of the stress sources in the Universe, the diffraction process affecting individual particles is extremely noisy.**

    - **While quantum effects appear random, they are more correctly described as deterministic but enormously chaotic. Dr. Einstein's statement that "God does not play dice with the Universe" is correct after all. (As an example, the variations in the paths of objects in the Asteroid Belt are deterministic, but those variations are sufficiently chaotic as to prevent rigorous analysis of their orbits, forcing them to be considered as having quasi-random deviations about their nominal orbits. Occasionally, those quasi-random orbital interactions are sufficient to throw an asteroid out of the Asteroid Belt completely. Occasionally, a radioactive atom throws one or more of its component nucleons from its nucleus.)**

    - **One would expect that the summation of quantum stresses from all of the events occurring throughout the Universe would occasionally combine to produce extremely large momentary quantum stresses at a given point. The effect would be analogous to the production of an unexpectedly large wave, called a rogue wave, in the ocean by the combination of a large number of different waves of considerably lower amplitude.**

14.11- A clear picture of reality emerges when examines the various aspect of quantum theory and the results of experimentation once one's thinking is no longer constrained by the unproven assertion of Special Relativity that information cannot travel faster than light. Velocity Relativity, or Special Relativity if the reader prefers, and Quantum Theory prove only that the propagation of information encoded in the form of energy is limited to the velocity of light and the attendant requirement that such information be quantified. There is no observational or theoretical requirement that subjects information which does not involve energy to those limitations. It is at this point that rote trained physicists can make a contribution. Their skills in the use of mathematics should allow them to apply flesh to our understanding of reality, even though they seem to deny the significance of that reality.

14.12- The Heisenberg Uncertainty Principle and the Wave Equations:- One of the earliest incursions of quantum concepts into classical physics was the Heisenberg Uncertainty Principle. It asserts that it is impossible to determine the product of the position and velocity of a particle to an accuracy smaller than the numerical value of Planck's Constant. This observational limit results from the fact that, in order to determine the position and/or velocity of a particle, whether it be an electron or a baseball, it is necessary to strike the particle to be measured with another particle,

such as a photon, and observe the result. Since both of these particles possess their own inertial masses and velocities, they exchange momentum as they interact. To illustrate, if an electron is examined by a photon of much lower energy than its mass equivalent energy, the photon is physically large compared to the electron and cannot measure the electron's position accurately. On the other hand, its inertial mass is low and does not affect the electron's velocity significantly. If the energy of the examining photon is high compared to the mass equivalent energy of the electron, its size is small compared to the electron's and it will observe the electron's position accurately. However, the inertial mass of such a photon is large compared to that of the electron and the interaction changes the electron's velocity considerably. The Heisenberg Uncertainty occurs because, in accordance with Quantum Theory, there can be no particle available to the experimenter which has both negligible mass and negligible size. Other than the fact that Quantum Mechanics predicts the relationship between the physical size and the inertial mass of particles, there does not seem to be a connection between the Heisenberg Uncertainty and either the Schroedinger Wave Equation or other quantum effects.

14.13- The Schroedinger Wave Equations were derived to deal with the observed impossibility of determining the location of electrons in their orbits as one would expect if they were distinct objects. Their locations were found to be fuzzy and it was necessary to describe their locations in terms of probability, as defined by the Schroedinger Wave Equations, rather than in terms of Newtonian Mechanics. Once it is recognized that the particles under observation, and the particles which are used to examine them, are themselves composed of waves, it is not unreasonable to expect imprecision in the observation of position and velocity. The observation of one wave with another is an imprecise process. While the probability waves described by the Schroedinger Wave Equations include this effect, they also result from a more subtle effect. Earlier, the storage of kinetic energy in a particle was shown to occur as a change in the energy of the particle itself and in the stressing of a disk like region of space around it. The storage of that energy requires time, and for periods of time which are shorter than the time required for that storage, the velocity restrictions imposed by Velocity Relativity do not apply. The particle is free to bounce around within a small region of space at velocities which are greater than the velocity of light. To an external observer whose ability to observe is limited to the velocity of light, however, the particle appears to exist simultaneously at more than one point within that region. As a result, the location of the particle can only described by the Schroedinger Wave Equations in terms of its probable position within a fuzzy volume of space.

Chapter 15 - Changing the Paradigms

15.1- The Chimera of a Unified Field Theory:- The last decades of Dr. Einstein's career are reported as having been spent in an attempt to develop a Unified Field Theory which would reduce all of physics to a single set of equations. While he was not successful himself, continuation of his efforts was at least successful in encompassing all forces but gravity into such a set of equations. The need for such a theory resulted from the fact that both General Relativity and the Quantum theory were accepted as correct and yet were incompatible with each other. That incompatibility reveals the weakness of limiting one's understanding to mathematical approaches. With such a methodology, a single unrecognized error can destroy the validity of enormous amounts of subsequent work. In this case, the unrecognized mathematical error in the derivation of General Relativity was the culprit. While the descriptions of curved space, Black Holes, Singularities, Worm Holes, etc. should have provided ample warning of that error, theoretical physicists trained to ignore common sense doubts relied on their mathematics and did not find it. (One is reminded of the medieval theologians who allegedly engaged in debate over the number of angels who could dance on the head of a pin.)

15.2- Eventually, the Standard Model and its proposed successor, the Superstring Theory and its

permutations evolved. In that approach, it was found that both a 10 dimensional and a 26 dimensional matrix of equations were capable of defining the observed gravitational, electromagnetic, the strong and weak nuclear forces, and the characteristics of quarks and leptons. When those matrix sizes were employed, all of the troublesome cross-products which occurred with other matrix sizes canceled and tractable solutions were obtained. (The arrangement of the ten dimensional set of equations is provided in Figure 15.1). In their writings on the subject, authors have raised the question as to what special properties 10 dimensional and 26 dimensional matrices have which allows them to work when other matrix sizes fail. The answer to that question should be apparent to anyone who is old enough to have operated a television set which had a horizontal hold control. If the horizontal hold control was not properly set, the horizontal scan lines would not line up vertically and an unviewable picture would result. Similarly, if an unsuitable number of columns is used in the matrix, the data in subsequent rows will not align properly in columns, cross products will result, and the equations will be unsolvable. In order to accommodate those ten or twenty six dimensions in the four dimensional space of General Relativity, however, theoreticians found it necessary to consider dimensions beyond the fourth to be curled into tiny circles having a diameter more than twenty orders of magnitude smaller than the nucleon. (Somehow, accepting such entities as dimensions strains the author's credulity. Even though they can be intermixed with the conventional dimensions in the solution of mathematical equations, they should be thought of differently and be given a different designation.) It would appear that these dimensions were necessary for the mathematical solution but it was necessary to consider them to be in that peculiar form and of that size in order to prevent them from being experimentally observable as new particles.

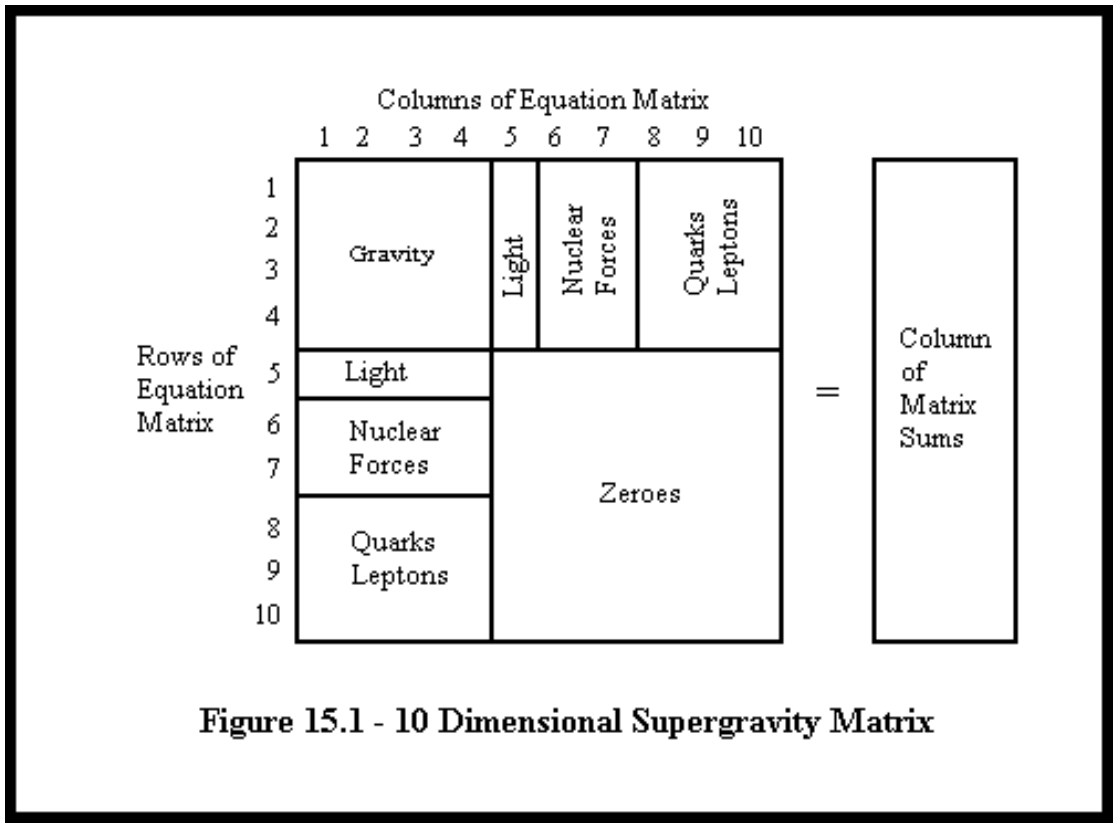


Figure 15.1 - 10 Dimensional Supergravity Matrix

15.3- Examination of the matrix illustrated in Figure 15.1 reveals that all of the terms referring to each item of interest (gravity, electromagnetics, strong and weak forces, quarks and leptons) are grouped in such a manner as to be independent of each other. None of the groups contain cross-products which tie them to the other groups. *The matrix is not a single set of equations defining everything. It is a grouping of four independent sets of equations which describe unrelated effects occurring in the same volume of space.* As such, they hardly represent a unification of physical theory. Descriptions of the mathematical efforts involved in the development of such unified theories assert that difficulties experienced by the theoretician are reduced as dimensions

are added. This is to be expected, the addition of superfluous degrees of freedom reduces the constraints on the theoretician's work. What separates the men from the boys is the capability of dealing with physical problems while retaining the number of degrees of freedom actually required by Nature.

15.4- The concept that matter consists of loops of radiation yields a simpler matrix of equations, as shown by Figure 15.2. Gravity is described by a 3x3 matrix of equations. Added to that matrix are a single row and column representing photonic effects and another row and column representing neutrinic effects. The strong and weak forces of the Standard Model vanish and electrons and quarks revert to permutations of electromagnetic and neutrinic radiation.

15.5- The Role of Paradox:-The recognition of a paradox always raises a flag. It tells us that two or more concepts which have been accepted as true are in conflict and it reveals, as did the Right Angle Lever Paradox described earlier, that an error exists in one or more of the concepts and it is necessary to rethink the ideas involved. In the case of the Right Angle Lever Paradox, the rethinking process resulted in a revision of the Lorentz Transformation for Transverse Force. Surprisingly, the community of physical scientists does not seem to make a significant use of the opportunities that paradoxes present. For illustration, two well known paradoxes, the Paradox of Zeno and Schroedinger's Cat Paradox are described.

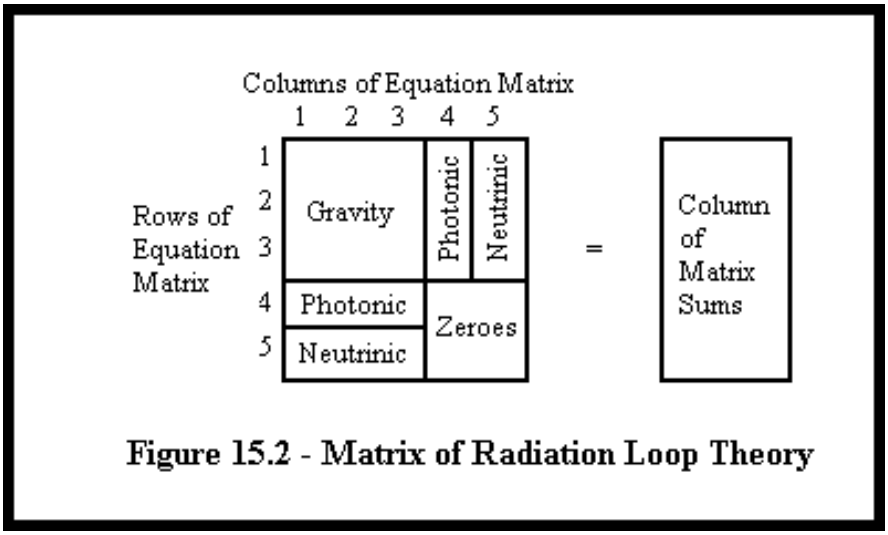


Figure 15.2 - Matrix of Radiation Loop Theory

15.6- The Paradox of Zeno is 2000 years old and its apparent ability to prove that all motion is impossible was not resolved until the mathematical techniques of Calculus became available, even though that technique is not required. One form of the paradox describes the flight of an arrow which has been shot at a target. The arrow is shot at a constant velocity, V, to a target at a distance, L, and the time of flight is divided into intervals. In the first interval, the arrow covers half of the distance to the target and, in each succeeding interval of time, it covers half of the remaining distance. Under the line of reasoning presented, the arrow never reaches the target because, after each successive interval of time, one half of the distance to the target that existed at the beginning of the interval remains. The author finds it incredible that this paradox has been taken seriously by intelligent men for over two millennia and has not been recognized as a form of trickery. If one accepts that in each successive interval of time the arrow traveled half of the remaining distance to the target, he must also accept that each of those successive intervals of time is half of the duration of the interval which preceded it. As a result, under the Paradox of Zeno, not only does the arrow never reach the target, the elapsed time of its flight never reaches the time, T, when the arrow would reach the target. There is no paradox in the Paradox of the Zeno. As long as one allows a cheap trick to fool him into considering only those events which occur prior to the arrival of the arrow at the target, he most certainly will believe that the arrow never reaches the target. The reality is that the passage of time does not slow as the arrow approaches the target and the arrow reaches the target on schedule.

15.7- The Schroedinger Cat Paradox is more esoteric. In one form of this paradox, a closed box contains a source of cyanide gas, a means of releasing that gas when a signal from a radiation detector senses an alpha particle (helium nucleus), and a radioactive element which releases alpha particles at a rate determined by its half life. A cat is placed in the box for a period of time equal to the probable time of the next release of an alpha particle. If the alpha particle is emitted before the cat is removed from the box, the cyanide is released and the cat dies. If the alpha particle is emitted after the cat is removed, it lives. According to quantum mechanics, the decay of the atom which results in the emission of the alpha particle is determined entirely by chance and, under the interpretations of quantum physics, the atom simultaneously exists in the both the decayed and undecayed states and only reverts to one of those states when it is observed. Schroedinger's Cat Paradox asserts that since there is no way to observe whether the cat is dead or alive while the chamber remains closed, quantum mechanics requires that the cat simultaneously exists in two states, both alive and dead, until its state is actually observed when the box is opened.

15.8- To the layman, Schroedinger's Cat Paradox seems absurd. How could it be possible for the cat to be both alive and dead at the same time? The layman is correct, the cat does not exist in both states simultaneously and quantum mechanics does not require that it do so. The significant observation is not the observation made by the experimenter when he opens the box, the observation which counts is the decay of the radioactive atom. Even the detection of its decay by the radiation detector is not a quantum mechanical consideration. Asserting that the cat exists in a dual alive-dead state until it is observed by the experimenter is about as sensible as asserting that the verdict in the O.J. Simpson trial was simultaneously 'guilty' and 'not guilty' as it lay overnight in a sealed envelope prior to being read. The significant observation in Quantum Mechanics is one which affects a physical particle. Whether an intelligent observer is aware of that observation isn't significant. The Schroedinger Cat Paradox is not a paradox as normally stated. It is an absurdity similar to the absurdity of the question as to whether a tree makes a sound when it falls in a forest with no one present to hear its fall. In the physical sciences, sound is a physical phenomena, not a psychological phenomena. It does not require the presence of an intelligent observer to exist.

15.9- The error flag presented by Schroedinger's Cat Paradox does reveal that our thought processes about quantum physics are inadequate. They are based upon the rigid acceptance of the idea that no entity can travel faster than light. Recognition of the fact that time is required for the kinetic energy level of a particle to change demonstrates that the idea that the velocity of light represents an absolute speed limit is not quite true. That time delay involved in acquiring(losing) kinetic energy allows a particle to travel a small distances at a velocity greater than that of light. To an observer, such a particle will falsely appear to be in two places simultaneously. When one adds the fact that stress in the quantum field propagates at a quasi-infinite velocity, the paradoxical effects attributed to the Schroedinger Wave Equations will probably vanish. *There can be no paradoxes in Nature.*

15.10- Can the Second Law of Thermodynamics be circumvented?- The validity of the First and Second Laws of Thermodynamics seems to be beyond question. Under the first law, the total energy content of a closed system must remain constant. Under the second law, the availability of energy for useful purposes must always decrease or remain constant within that closed system. In effect, the First Law of Thermodynamics states that you can't win and the Second Law states that, furthermore, you can't break even. The First Law of Thermodynamics is unquestionably true, energy can neither be created or destroyed, General Relativity not withstanding. The Second Law of Thermodynamics stands on less firm ground because it is a law based upon statistics. As such, it is in the same category as an actuarial table. An insurance company can predict quite accurately how many people will die in a given year. They cannot predict who those people will be. Statistical laws are valid for large numbers of events, they become less significant as the number of events is reduced. As an example, if one patronizes a casino, he might initially win a large sum of money playing a slot machine, but if he continues to play he not only will give all his winnings back to the casino, he will sustain a significant loss. The question then arises as to whether it is possible to by-pass the Second Law of Thermodynamics though the use of nanomachines. (A nanomachine is

a mechanism whose significant dimensions are measured in nanometers, the size scale of atoms.)

15.11- One who observes Brownian motion in a microscope might reasonably conclude that, in principle at least, a nanomachine could be built which would bypass the Second Law of Thermodynamics. When a liquid containing microscopic particles is observed, the particles are seen to be in continuous (Brownian) motion. That motion is caused by random thermal impacts between the molecules of the liquid and the particles. If the thermal motion of water molecules can produce a visibly observable motion in particles which are at least 10^{15} times as massive, it certainly not unreasonable to believe that suitable nanomachines could organize the effect to produce a useful mechanical output. The postulated nanomachines would then be able to export energy to the outside environment which it obtained by reducing the temperature of the liquid. The exported energy would be converted to heat and raise the temperature of the external environment as the output performed useful work. The resultant temperature difference between the environment and the liquid will then cause the energy which had done useful work to flow back into the liquid to return it to its original temperature and allows the process to continue indefinitely.

15.12- James Clark Maxwell proposed a hypothetical perpetual motion machine, known as Maxwell's Demon, which was not proven to be theoretically unworkable for 75 years. In that machine, Maxwell imagined that a demon controlled a microscopic gate between two gas filled chambers. Making use of the fact that, in a gas, the velocity of the molecules is random and that the temperature of the gas is determined by the mean velocity of those molecules, Maxwell proposed the concept that, if an appropriate demon existed, he could sense the speed of molecules approaching the gate and open the gate only when a fast molecule approached it from one side or when a slow molecule approached it from the other side. By operating the gate in this manner, the demon would sort the molecules so that one chamber contained fast molecules and the other chamber contained slow molecules. Since the temperature of a gas is determined by the mean velocity of its molecules, such a process will maintain a temperature difference between the chambers which can be exploited to produce useful work in a direct violation of the Second Law of Thermodynamics. It took 75 years before a rigorous proof was found which was able to show that the energy required for Maxwell's Demon to identify the fast and slow molecules and allow the gate to operate was at least as great as the energy which could be released and Maxwell's Demon was shown to be an unworkable concept.

15.13- There is a modification to the concept of Maxwell's Demon for which there is, at least as yet, no valid theoretical objection. Suppose that the two chambers of the Maxwell's Demon example no longer rely on a demon but are separated by a diffusion membrane having a permeability from side A to side B which is higher than the permeability from side B to side A, as shown in Figure 15.3. The energy required to allow the membrane to make the decisions it needs to make in order for it to function in this manner is available in the kinetic energy of the gas molecules passing through it. In diffusing through the membrane, molecules can provide the energy needed by being slowed from their average room temperature velocity of about 1300 feet per second to a much lower exit velocity. The lower velocity of the gas leaving the membrane means that side B is colder than the ambient temperature. The loss of kinetic energy by the molecules as they pass though membrane provides the energy required to operate the differential diffusion mechanism in the membrane pores, and the membrane becomes warmer than the ambient temperature. If the surface areas are sufficiently large, the temperature of the gas on both sides of the membrane and of the membrane itself must remain close to the temperature of the environment. As a result, the pressure in chamber B will be higher than the pressure in chamber A. That difference in pressure can be used to operate a turbine and provide useful output power. As the output power is produced by the gas flowing through the turbine, the chambers are cooled below the ambient temperature and energy flows from the environment to the chambers to replace the energy delivered by the turbine. The arrangement would extract useful energy from its environment in direct contradiction to the Second Law of Thermodynamics.

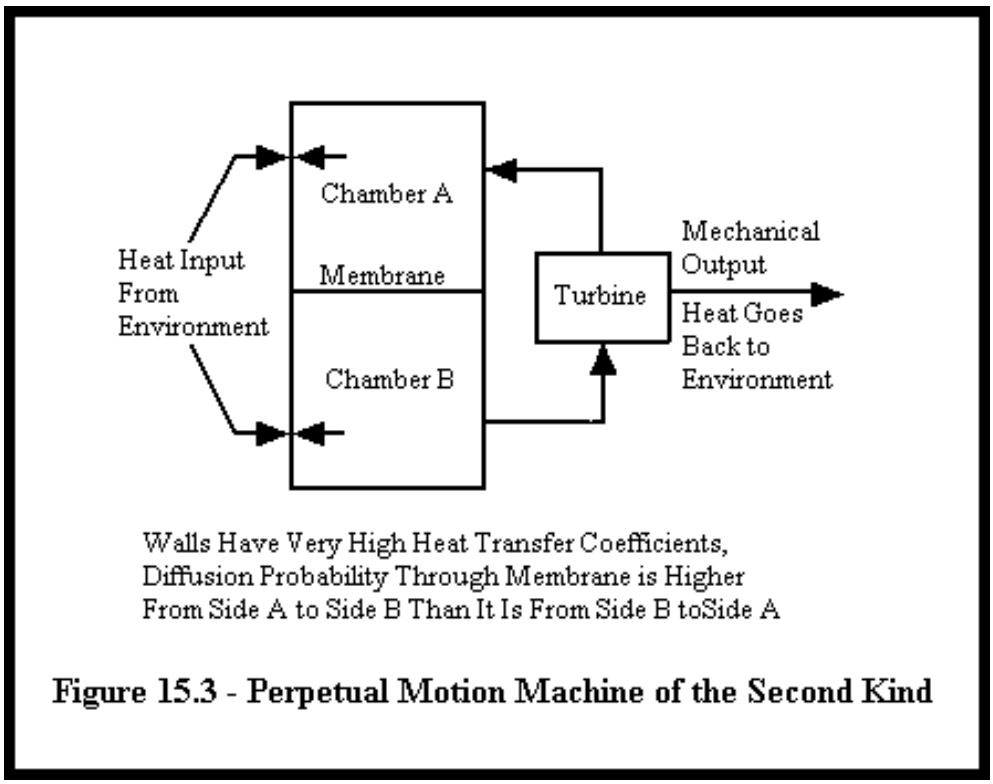


Figure 15.3 - Perpetual Motion Machine of the Second Kind

15.14- Conceptually, the membrane might be constructed with pores which were covered by spring loaded trapdoors, as shown in Figure 15.4. In this illustration, a molecule represented by a ball would approach the right side of the membrane at a velocity which was appropriate to its temperature, knock the trapdoor open, and pass through it. A similar molecule approaching the trapdoor from the left side would bounce back and not pass through to the right side. When the molecule on the right passed through the trapdoor, it would lose most of its kinetic energy to the trapdoor and exit at a low velocity. As a result, the trapdoor and the membrane would be heated and the molecule which passed though it would be cooled. The process would generate a local temperature difference which would quickly be equalized by any reasonable level of heat transfer.

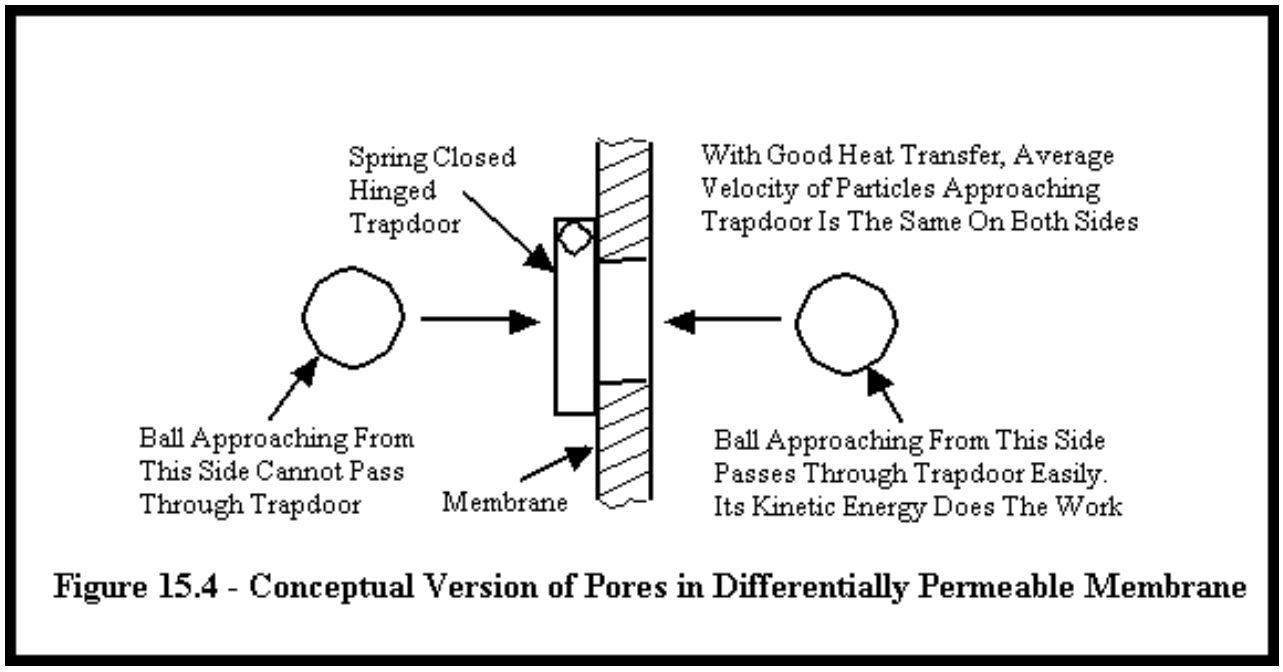


Figure 15.4 - Conceptual Version of Pores in Differentially Permeable Membrane

15.15- The first theoretical objection to this type of perpetual motion machine that the author has found in literature is that it cannot work because it violates the Second Law of Thermodynamics.

This is hardly a valid objection since the arrangement is specifically designed to bypass the limitations of that law. The Second Law of Thermodynamics is a statistical law and it is not binding on nanomachinery since such mechanisms deal with molecules on an individual basis and the pores of the diffusion membrane certainly qualify as a nanomechanism. The only other theoretical objection that the author has found was provided in another book by Dr. Feynmann in which he described a nanomechanism consisting of a riverboat type of paddle wheel mounted on a shaft inside a cylinder containing a fluid. The paddle wheel was bombarded by the random motion of the molecules of the fluid and caused the shaft undergo a random rotary oscillation. To convert this motion to a useful output, an external one-way ratchet was attached to the shaft. Dr. Feynmann then demonstrated that the device would not work because the notion of the ratchet pawl would generate enough heat so that the resultant molecular motion would make the pawl bounce sufficiently to render the one way mechanism inoperative.

15.16- From the description provided, it is obvious that, while Dr. Feynmann is an excellent theoretical physicist, he is not as effective as a design engineer. Relocating the ratchet mechanism to the interior of the fluid chamber cools it and dampens its bounce, causing Dr. Feynmann's objections to vanish. When the model is modified, Dr. Feynmann probably would be forced to agree, that unless he could devise another objection, the concept should represent a physically realizable device which would by-pass the Second Law of Thermodynamics. A theoretical demonstration that the mechanism suggested by the author cannot work requires a proof that the permeability of all possible diffusion membranes must be the same in both directions. Deriving such a proof may be particularly difficult because the pores of the required membrane are able to extract energy from the molecules which pass though them. Considerable effort is justified in developing such a proof because, if that proof cannot be found, the possibility of building a perpetual motion machine of the second kind is not foolish and an all out effort is justified to demonstrate it. If it can be built, society would have an inexhaustible and pollution free source of energy which probably could be sized for use in the smallest homes and the largest factories.

15.17- The Uniqueness of the Earth:- There is considerable interest in the possibility that there may be a large number of planets in our galaxy which are suitable for life. In the hope that there may be intelligent life on planets lying within a reasonable distance, a project named SETI (Search for Extraterrestrial Intelligence) has been set up to search for evidence of that life. The idea behind the project is that intelligent life may be generating signals which can be received on Earth that are either a by-product of their civilization (such as our own radio broadcasts) or a deliberate attempt to communicate. Unfortunately, the probability of success of those programs is far lower than currently believed. If an Earth sized planet existed 93,000,000 miles from a star which was virtually identical to the Sun, it is extremely unlikely that it would be capable of supporting life. To see why this should be so, an examination of our own Solar System is order.

15.18- With the exception of Mercury, the Earth, Mars, and Pluto, all of the planets have enormous atmospheres (relative to the Earth). One can draw no conclusions about the the original conditions on Mercury or Pluto. Mercury is too small and too close to the Sun to have prevented its atmosphere, regardless of its original quantity, from boiling away to space. (There may be a remnant of an atmosphere frozen at the poles.) At the other extreme, due to its distance from the Sun, any atmosphere that Pluto may have had at its beginning and which has not been lost by evaporation to space is frozen solid and is therefore unobservable. Observations have shown that Mars once had a significant atmosphere which supported running water (and, by implication, oceans) but has lost both. Apparently, its low gravitational mass has made it too easy for the Sun's radiation to cause Mar's atmosphere to evaporate to space. Of all the planets, it is Earth that is the anomaly.

15.19- Due to its location, Venus receives about twice the heat input from the Sun as does the Earth. Its gravitational mass is slightly less than that of the Earth and yet it has an atmosphere about 70 times as dense as the Earth. It seems reasonable to conclude that the early history of the Solar System probably went through the following stages:

- **The planets were formed by the collision of smaller objects circling the Sun in eccentric orbits. The collision process continued until the Solar System was virtually cleared of objects in non-circular orbits.**
    - **During the planetary formation stage, the planets could not acquire atmospheres because the bombardment which was forming them made their surfaces extremely hot. Any atmospheric gases which impacted the planet from interplanetary space would boil away immediately.**
- **Once the rate of bombardment forming the planets reduced to the point where the planets could cool sufficiently, they proceeded to collect atmospheres from the gases which remained in the Solar System.**
    - **For Venus to have its present atmospheric density, all of the planets, including the Earth, must have acquired enormous (by Earth standards) atmospheres.**
        - **A planet gains atmosphere by sweeping up gases from interplanetary space. It losses atmosphere through evaporation of those gases to that same space from its uppermost layer.**
- **In order for a molecule of gas to be lost to the planet, it must acquire a thermal velocity greater than the planet's escape velocity. This must occur at an altitude at which the atmosphere is sufficiently thin so that it does not strike other molecules while escaping.**
    - **The rate at which atmospheric gases are lost to space is determined almost entirely by the rate of energy input from the Sun and by the escape velocity of the planet at the top of its atmosphere The rate of atmosphere loss is virtually independent of the amount of atmosphere the planet owns.**

15.20- The Earth-Moon system has two characteristics which are anomalous compared to the other planets. The first is that it has far too much angular momentum (orbital angular momentum, rotational angular momentum of the Earth and the Moon, and orbital angular momentum of the Moon around the Earth). As pointed out in a text by Dr. Urey, an exponential plot of angular momentum vs total mass for all of the other planets yields a straight line. The total angular momentum of the Earth-Moon system lies far above that line. The second anomaly is that it contains far too little atmosphere and, unlike Mars, the density of that atmosphere has remained almost unchanged. A satisfactory explanation for both of these anomalies seems to have been provided about a decade ago by a computer simulation of a glancing impact on the Earth by an object having a mass about one sixth of its mass. The simulation predicted the formation of a binary system with a Moon sized object orbiting the Earth an altitude of about 12,000 miles, with the Earth having a 4 hour day, and with the Earth having captured the iron cores of both objects. Since the length of the Earth's day was, is, and will remain less than the Moon's orbital period until the Sun enters its red giant stage, tidal effects on the Earth will perpetually transfer angular momentum from the Earth to the Moon. This transfer has lengthened the Earth's day to 24 hours and has caused the Moon's orbit to increase to 238,000 miles. More important, such an impact would have blasted away most if not all of the Earth's atmosphere and, if the collision occurred late enough in the formation period of the Solar System, most of the interplanetary gases would have been absorbed by the other planets and/or lost to interstellar space. This scenario could easily allow the Earth to have the comparatively puny but stable atmosphere required to support the evolution of intelligent life.

15.21- In order for a planet to support life, not only must it be in the "life zone" about a suitable star,

it must possess an atmosphere of a suitable density for a sufficient period of time for life to evolve. On the Earth, life does not seem to prosper above an altitude where the density is half an atmosphere. At the other end of the scale, the atmosphere must not be too thick or the wavelengths of radiation needed for photosynthesis not only will not reach the atmosphere-water interface where life begins, that interface is likely to be too hot. Making the optimistic assumption that four and a half atmospheres is the highest suitable atmospheric pressure requires that a life supporting planet not lose more than four atmospheres of density in the period required for intelligent life to evolve. For a planet starting with the atmospheric density of Venus to lose 60 PSI of surface atmospheric pressure in 3 billion years (the time required for intelligent life to have evolved on Earth), the existence of such life would require an age of 50 billion years for the planetary system. Such a conclusion presents problems. A star similar to our Sun will become a red giant about 10 billion years after its formation and the apparent age of the Universe is only 15 billion years. On the other hand, if a planet such as Mars lost its atmosphere at a sufficient rate to reach compatibility with the requirements of life before its star became a red giant, it would pass though the "life range" so quickly that intelligent life would probably not have had time to evolve. It is the author's belief that, without the addition of the 'wild card' implicit in the postulated Earth-Moon collision, a planet capable of supporting life cannot exist. (It is hoped that this question would be examined further.) It is the author's belief that intelligent life is much rarer in the Universe than Dr. Sagan suggested.

15.22- A Comment on Meteorites and the Asteroid Belt:- The asteroid belt exists as a ring of stony and iron rocks in orbit about the Sun between the orbits of Mars and Jupiter. The radius of that orbit coincides with the anticipated location of a planet 's orbit under the conventional theory of planetary formation. If one examines the objects in the asteroid belt, the moons of Mars, and the meteorites which strike the Earth, one finds that, unlike comets, they are densely composed of stone or of iron. Unlike the flimsy comets, such objects cannot form by accretion, they can only be formed within a planet sized object. One must conclude, therefore, that initially a planet did form at the radius of the asteroid belt and was later shattered by a collision. Such a collision would drive away most of the planetary material and leave a residue of rocks from the planets upper layers and iron objects from the planet's core. It seems probable that the object which impacted the early Earth to form the Earth-Moon system, the meteorites which strike the Earth, and the moons of Mars resulted from that collision.

Chapter 16 - What Can We Conclude?

16.1- Prior to the early years of the 20th Century, the assertion (which the author's memory suggests originated with Lord Raleigh) that there was no phenomena in Nature for which a model could not be built was an accepted philosophy. The building of such conceptual models was considered to be a goal of the physical sciences. Obviously, since we exist, Nature has already built that model and it is our task to understand it. The task of the physical scientist was deemed to be one of postulating mechanisms by which nature might function in the observed manner, mathematically analyzing the behavior of those mechanisms, and finally devising and performing experiments to determine the validity of the envisioned mechanization. It was expected, of course, that such a process would be iterative. One could never hope to get it right the first time, but each iteration would hopefully be closer to representing reality until any discrepancy which remained was sufficiently small as to be unobservable. With this philosophy, our methodology in understanding Nature was akin to a three legged stool with one leg representing the conceptual model, the second leg representing the mathematical analysis of that model, and the third leg representing the experimental verification of the validity of the first two legs. Just as a stool with less that three legs is at best unreliable, one would expect that a science missing one of these legs to also be unreliable and, as we have seen, this is the case.

- **Without a conceptual model we cannot know to whether our mathematical analyses are relevant and what information our experiments have provided. (As an example, consider the experimental measurement of the velocity of light, as discussed in Chapter 6. The experiment measures something but it most certainly does not measure the velocity of light.)**

- **Without a valid mathematical analysis of the model, it cannot be known whether the model will function in the anticipated manner and what experimental results are required to validate the model and its mathematical analysis.**

- **Without experimental verification, one cannot be sure that the model and its mathematical analysis represents reality or delusion.**

Unless all three legs of the stool are used in the acquisition of knowledge understanding is likely to be faulty and, as this text shows, is likely to produce weird and untenable conclusions when used as the basis for further work.

16.2- Mathematics is an extremely powerful tool, and properly applied it yields perfect results. Like all powerful tools, it is dangerous. Mathematics relies upon a sequence of logical steps and, since the steps are in sequence, the probability of an error having been made increases in proportion to the number of steps involved. In addition, the mathematical model provides no assurance that it is consistent with the reality it is attempting to describe. On the other hand, the building of a conceptual model involves the generation of a pattern whose agreement with reality is readily determinable. (It is impossible to complete a jigsaw puzzle incorrectly.) The probability of an error in a conceptual model decreases as the number of its components increase regardless of the level of the individual errors, but the model does not have the rigor of the mathematical approach. (The error reducing capability of the conceptual model approach is analogous to the error reducing capability of the process, known as Kalman Filtering, used in advanced navigational systems. Kalman Filtering combines the weighted "best guess" accuracy estimates of many lower accuracy inputs to produce a conclusion of higher accuracy.)

16.3- The conceptual model has an advantage over the mathematical approach in solving physical problems. It makes use of the most powerful capability of the mind, its pattern recognizing ability. The power of the mind's pattern recognizing capability was dramatically brought home to the author at the start of the missile era when he had the responsibility for the development of a star tracker capable of operating in full daylight using a television camera tube. When an image of a simulated star and sky was viewed on a television screen, the image of the star abruptly became recognizable to the eye when the peak star signal to RMS noise ratio of the display exceeded 1:1. The peak star signal to RMS noise ratio required for recognition by logic circuitry (analogous to a mathematical approach of solving problems) was, and still is, 6:1. A reasonable man might well conclude that the brain's inherent pattern recognizing capability is much more powerful than its capability of performing logical reasoning.

16.4- Relying upon the pattern recognizing capability of the brain to solve physical problems is difficult for an organized structure of knowledge. Its successful use depends upon the inborn talent of the individual involved, the proper training of that talent, and the protection provided to that talent from the strongly motivated efforts of untalented teachers to force him to conform to their own limitations. The untalented majority will invariably complain that talented individuals are intellectual mavericks whose reasoning is impossible to understand even though it seems to lead to valid results. Their complaints are understandable, but the problem lies in the fact that the majority is attempting to engage in activities for which it does not have the required aptitude.

16.5- Science and technology are the only areas in human endeavor where the requirement for talent is not considered to be primary. The need for talent in sports or the arts is unquestionable. No one would attempt to assemble a major league ball team by training a highly motivated group of randomly selected individuals. If those individuals were not innately talented, they could not be

trained to a level which would permit success and the team would be a dismal failure. Talent cannot be taught. Michael Jordan could not teach untalented individuals to reliably sink a basket from midcourt nor could Hank Aaron teach them to swing a bat so as to drive a baseball into the centerfield stands. When the occasion arises, talented individuals don't consciously think about how they are going to perform their task, they just do it.

16.6- Up until the 20th century, innate talent was necessary for leadership in the physical sciences but, with the introduction of Dr. Einstein's work, it became possible for the untalented majority to gain ascendancy. The same intellectual takeover occurred after World War II in Engineering and the costs and failure rates of sophisticated projects greatly increased. (It is fortunate for the USA that this effect did not take place earlier or the war is likely to have been lost.) Admittedly, engineering has accomplished a great deal since that time but at an excessive cost in money and time. It is no accident that, when a project such as the development of the U-2 aircraft is required, the work is performed in a skunk works, it is not performed in a mainstream organization. (The one statement that the author can quote verbatim from a college instructor after almost 50 years is that "an idiot can do anything that an engineer can, the difference is that it will take three time as long and cost five times as much".) In the basic sciences the situation is much worse. While anyone can tell whether an airplane flies, they cannot tell whether there is a wormhole in space or whether the Law of Conservation of Energy is consistent with the gravitational field. The end result is that the rules of a religion have been imposed on the physical sciences and those sciences have been degraded to a level analogous to that of a medieval theology which, as mentioned, debated the number of angels who could dance on the head of a pin. It is no accident that the PC industry was started by two men working in a garage rather than by a huge corporation.

16.7- The selection and training of talented individuals is a difficult process. They can only be identified by their ability to arrive at valid results by unanticipated, and perhaps incomprehensible routes. The conventional educational approach in the sciences and the technologies is to attempt break those individuals away from their unorthodox thought processes and force them to conform to accepted practices and ideas rather than to recognize their talent and assist them in its development. Talent in both the physical sciences and in technology operates by making use of the pattern recognition capability of the mind and, because it operates in the background, the individual possessing the talent is normally unaware of the thought processes involved and ascribes their results to intuition. Depending upon the lifelong personality of the individual, the innate level of that talent and the discipline that he has exerted in training it, the reliability of an individual's intuition varies from zero to perfection. As is the case with a computer, GIGO applies. In order for the pattern recognizing capability of his brain to be effective in the solution of physical problems it is necessary for an individual to have accepted a certain set of learning rules for himself. These rules are:

- **Everything he accepts as true must agree with everything else that he accepts as true.**
    - **In the event of contradiction, the validity of the relevant information, both old and new, must be considered to be tentative.**
    - **If the information is more than trivially important, the necessary effort must be made to resolve any inconsistencies by correcting the new and/or the old information.**
    - **The more items of information processed in this manner, the closer one's store of knowledge will approach absolute validity. (It will never be perfect, no one lives that long.)**
- **One must never assume that his source of information, no matter how revered, is correct.**

    - **Where necessary in an academic or business situation, one must keep two sets of books. One set of books must contain the information expected by the individuals possessing power over your future and the other set must contain the information you have determined to be true.**

- **One must never allow himself to be brainwashed or bullied into not following the preceding rules.**

If an individual follows these rules from an early age, he will find that his intuition, also known as common sense, will be extremely reliable and will provide him with information long before he understands it consciously. As a bonus, the information will be correctly labeled as to its reliability. Intuition only yields faulty results if an individual has failed to adequately follow the rules described above.

16.8- Is the information presented in this book more nearly correct than presently accepted concepts? The author believes that it is for the simple reason that he can find no contradiction between the various items of information involved. On the other hand, the presently accepted concepts are severely inconsistent. They are as full of holes as lacy swiss cheese. Will the material that the author has provided require improvement and correction? Certainly it will, no one can cover this much material without error. As to where our understanding of reality will lead, only time will tell. Unfortunately the author's age insures that he will not be around to see the results.

16.9- ***Common Sense is another name for intelligence. While mathematics and experimentation require intelligence for their development, their usage does not directly involve intelligence. In their application, they are merely tools which must be used as an adjunct to intelligence.***

To Other Links:-

To "Gravity" * * To "Corrections to Special Relativity" * * To The Website

Mileva Einstein-Maric

(the author prefers to remain anonymous)

It is a truism to state that Albert Einstein was undoubtedly a genius and a breathtakingly original thinker. Nothing in this article can or should take away from the accomplishments of the most celebrated scientist of all time. But a basic sense of justice and fair play requires that credit must be given where credit is due. It is in that spirit that the world should know the name (and credit should be given) to an equally brilliant scientist, Mileva Maric, the first wife of Albert Einstein.

Albert Einstein met Mileva Maric when he entered the elite Swiss Polytechnic school ("ETH") in Zurich. [An aside: Albert did not initially gain admittance to this elite school and much has been made by Einstein's critics that Einstein was only admitted on his second attempt. While it is true that Einstein did not initially pass the admittance test, this had nothing to do with his mathematical or scientific understanding. In fact, Einstein scored very well in math and science on the admission test (See the *Collected Papers of Albert Einstein*, Princeton University Press). Where he failed was in his French test; the Swiss were very picky about French, and although it seems Einstein's French essay was very good, it was not good enough to satisfy the high standards of the picky French professors. Further, Einstein was trying to gain admission to the Swiss Polytechnic at the tender age of 16, without even having first completed high school. The Swiss Polytechnic advised the young Einstein that they were impressed by his math and science scores but he should really finish high school first and then try to gain admission the next year.

Encouraged by kind words of the Swiss Polytechnic, Einstein went back to high school in Germany, got his high school diploma, and was easily admitted on his second attempt to enter the Swiss Polytechnic. See Abram Pais, *Subtle is the Lord…- The Science and the Life of Albert Einstein*, Oxford University Press, 1982]. On entering the Swiss Polytechnic school in Zurich, the young 17 year old noticed the only woman in the class, Mileva Maric, a brilliant Serbian student. Maric remained the only woman studying physics at the Swiss Polytechnic the entire time Einstein was there. Maric was four years Einstein's senior. She was a Serb, an Eastern Orthodox Christian, short of stature, had a limp and was extremely bookish. In addition to taking the exact same course-work in college that Einstein took, Maric studied on her own for one semester in Germany under Phillipe Lenard, the Nobel Prize winning physicist who discovered the photo-electric effect (which was explained in one of the 1905 papers attributed to Einstein).

Soon the two physics students fell in love and began living together, sharing love and textbooks. The work they would do together would change the world of science and re-arrange

the universe. Maric is finally beginning to be noticed among scholars. Her achievements were first chronicled by Desanka Trbuhovic-Gjuric in her book *In the Shadow of Albert Einstein*, which, unfortunately, has been published only in German. Because Trbuhovic-Gjuric relied on oral reports of friends of the Einsteins her documentation is not considered rigorous enough. Trbuhovic-Gjuric writes that Maric always considered herself as partner of Einstein, and when asked why she did not insist on more of the credit for their joint work, she replied, "We are one stone; Ein stein."

The Serbian scholar Dord Krstic has written about Maric's close working relationship in an Appendix to the book, *Hans Albert Einstein: Reminiscences of his LIfe and our LIfe Together*, written by Elizabeth Einstein, the wife of Einstein's son, Hans Albert Einstein.

Senta Toremel-Ploetz has written a noteworthy article on Maric, "Mileva Einstein Maric, the woman who did Einstein's mathematics" in *Women's Studies International Forum*, vol. 13, no. 5 (1990).

By far the most interesting and insightful writer on Maric is Dr. Evan Harris Walker, who literally has turned the Einstein image around, crediting Maric with having formulated the Special Theory of Relativity as well as other ideas now commonly attributed to Einstein. Many other popular writers have adopted the insights of Dr. Walker; it is his manuscript *Ms. Einstein* (1990) that remains the leading work so far on the collaboration between Einstein and Maric. Dr. Walker is hereby credited for the information and ideas contained in this article. It was he who first seriously pushed the idea of an Einstein/Maric collaboration. And what a collaboration it was! The *Collected Papers of Albert Einstein* prove to any open-minded person, that Maric did indeed collaborate on the authorship of Einstein's famous papers in 1905. Einstein even uses the word "collaboration". Just a sample quote from Albert to Mileva from their love letters:

"How happy and proud I will be when the two of us together will have brought our work on the relative motion to a victorious conclusion!"

Our work???

This is just one isolated quotation. One should read the entire *Love Letters*, published in the *Collected Papers of Albert Einstein* by the Princeton University Press and separately as *The Love Letters; Albert Einstein and Mileva Maric* edited by Jurgen Renn and Robert Schulmann and translated by Shawn Smith. There you will find that Albert shares all his physics ideas with her and is extremely interested in her opinion. There are literally dozens of examples. See also the copyrighted manuscript by Evan Harris Walker *Ms. Einstein*.

No two physicists ever had a closer relationship: Mileva and Albert ate together, went to school together, shared ideas together, shared textbooks together, slept together, raised children together and discussed physics together. The *Love Letters* prove incontrovertibly that they discussed in great detail the work of physicists and mathematicians like Lenard, Helmholtz, Hertz, Drude, Boltzmann, Kirchhoff, and Planck. In their leisure hours, Mileva often would play the piano accompanying Einstein's violin while they entertained friends, including Einstein's inner circle: Michele Besso, Paul Ehrenfest, Conrad Habicht, Marcel Grossmann, Maurice Slovine. This group eventually became known as "The Olympia Academy."

Senta Troemmel Ploetz, in her excellent paper, quotes Einstein as telling his friends that his wife did his math for him. When one realizes the highly mathematical aspect of the 1905 Special Relativity paper, which relies heavily on derivations of the Lorentz transformations, then one can see the importance of having a first-rate mathematician's help. The *Collected Papers of Albert Einstein* even have a photo-static copy of one of Albert's college notebooks, in which Mileva has gone through and corrected Albert's math! Yet the myth of the isolated Einstein working alone, who all by himself, without help from anyone, wrote four brilliant papers on physics in 1905, endures. These papers included the work on Special Relativity; the photo-electric effect; an explanation of Brownian motion; and the famed formula, $E=mc^2$. All this is detailed in the *Love Letters* and in Dr. Walker's paper, *Ms. Einstein*.

Yet "Einstein Establishment" has been reluctant to recognize the important role Maric played. John Stachel, the first editor of the *Collected Papers of Albert Einstein*, has recently moved away from previous statements that Maric was a mere "sounding board" for Einstein, and has grudgingly stated that she has played a "small but significant role" in Einstein's work.

See http://www.ucl.ac.uk/sts/cain/pubs/rev-pyc.htm.

But was her role really so small?

In addition to the many references to joint work and swapping of textbooks, Dr. Walker has found fascinating evidence that Mileva Maric may have actually put her name on the original manuscript of the Special Relativity. Naturally, the original manuscript for the Special Relativity paper is missing. It was lost during Einstein's lifetime. Yet, Abram Joffe, a summa cum laude Russian physics graduate of the ETH is quoted as having seen the original 1905 manuscript and said it was signed, "Einstein-Marity" (Marity being the Hungarianized version of Maric'; at that time Serbia was under the dominion of Austro-Hungarian empire). Joffe died in 1961. (see *Ms. Einstein* by Evan Harris Walker.)

It is interesting that Joffe would remember the name as "Einstein-Marity" since "Marity" was the Hungarianized version of Maric. Mileva Maric rarely wrote her name as "Marity" except on important formal documents, such as her wedding certificate. That Joffe would remember the name specifically as "Marity" lends credence to his having seen the original Special Relativity manuscript. It is extremely unlikely that Joffe could have made a mistake.

Moreover, when Albert admitted adultery and divorced Mileva in 1919, he promised that in the event he should win the Nobel Prize all the money-not part of the money but all the money-would go to Mileva. According to the Einstein biography, *Subtle is the Lord*, Einstein kept his promise. When he received the Nobel Prize money in 1922 (he was awarded the prize for the year 1921; the award was announced and he received the money in 1922) Albert did indeed give Mileva all the money from the Nobel Prize. Why all the money?

There are other strange aspects to Einstein's life. Einstein was extremely secretive about his first marriage. It was only in 1987, with the publication of the *Love Letters* between Albert and Mileva that we find out Einstein fathered a daughter, named Lieserl, the first child of Albert Einstein and Mileva Maric. Nobody really knows what happened to this child; there is a

mention in one of the letters to her having scarlet fever and it is believed that the child was put up for adoption in Serbia. Albert never breathed a word about her publicly during his lifetime, which is quite strange.

The *Love Letters* also make clear that Mileva Maric was absolutely hated by Einstein's mother, Pauline, who protested to her son that Mileva was, "a book like you." Still, despite his mother's fierce objections, Einstein stubbornly went ahead and married her. It was during this marriage that Einstein is credited with producing the 1905 papers which made him famous.

After they married, Mileva bore Albert two more children, sons Hans Albert and Eduard. Eduard suffered psychological troubles throughout his life, and according to Dord Krstic was even seen by Sigmund Freud.

Maric seems never quite willing to take complete credit for the work she did. Much has been made of Maric never having graduated from the Swiss Polytechnic, implying that she could not have been the intellectual equal of Albert Einstein. This is simply not accurate.

Mileva faced the obvious invidious prejudice of being a woman. Remember, in 1900 women couldn't even vote! Even to be allowed admittance as a woman to the elite Swiss Polytechnic, she had to have been brilliant. Although her grades were comparable to Einstein's grades, Mileva ultimately did not pass her final examinations. It must be noted, however, that at the time she was taking these exams she was late in her pregnancy with Albert's second child (his son, Hans Albert) and also faced the prejudice of her teachers for being both a Slav and a woman. She was, indeed, the only student in Albert's class not to graduate, although she did receive a research position with Professor Weber, which later fell through. Of the students who did actually graduate, Einstein had the lowest grade point average (see *The Collected Papers of Albert Einstein*, Volume 1, which lists the grades of all those who graduated; also see Dr. Evan Harris Walker, *Ms. Einstein*.)

Einstein rarely mentioned those who assisted him. Indeed, in all the famous 1905 papers that he published, only Michele Besso, his friend and sounding board, is mentioned. There is simply no other source material cited in any other of his 1905 papers.

We know from the *Love Letters* that he had a very close collaboration with Maric. Unfortunately, these letters are heavily edited, the omissions being mainly from Maric's letters. Why are Maric's letters so heavily edited? Why are there so many omissions? Will the editors of the *Collected Papers of Albert Einstein* publish or make available Maric's letters in their entirety? Some have felt that Maric's senior thesis at the Swiss Polytechnic might actually have dealt with Relativity theory but, according to correspondence I have had with Professor Bartocci of the University of Perugia, her thesis cannot be located in the Polytechnic's archives.

Einstein's marriage to Maric ended in acrimony. He began treating Maric, for whom he had originally professed such great love, cruelly toward the end of the marriage, even calling her "uncommonly ugly" (see *Collected Papers*). He admitted in a deposition during divorce proceedings (28 December 1918) that he had carried on an adulterous relationship with one of his cousins, whom he later married. During this second marriage, Einstein had numerous affairs, even including -apparently - an affair with a Russian spy! And again, Einstein never

breathed a word about having fathered a daughter with Maric.

The full truth of Mileva Maric's role in the work now commonly attributed exclusively to Einstein will only become known when the complete, unedited letters of Mileva Maric are made available to scholars. It is also a fervent hope that the senior thesis of Maric might be found - or at least its subject might become known - because that thesis might actually have been about Relativity theory. Clearly, further research on her life and her physics work needs to be done.

Arts/literature

Elakovic
Djurovic
Militch
Ognjenovic
Samardzic
Trajkovic
Zackheim

M I C H E L E Z A C K H E I M

Einstein's Daughter: The Search for Lieserl

|prepared by Aleksandra Janjic

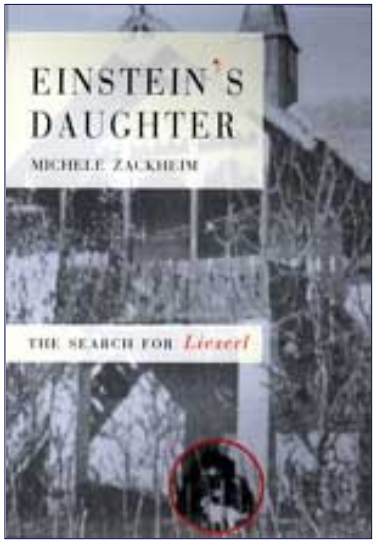
"On January 27, 1902, Mileva Maric secretly gave birth to a girl at her parent's home back in Serbia. Neither Mileva nor Albert ever talked about her, even to close friends. Like some brief, fiery meteor, the baby named Lieserl soon vanished into the Balkan night.

A mystery remains? What happened to Lieserl? And after they married, why didn't the couple bring her back to Switzerland and legitimize her birth? Was she given up for adoption, as many scholars believe, because she might have endangered Einstein's new career as a patent-office examiner in Calvinist Bern? And might she still be alive somewhere in Serbia, a wizened relic of the great relativist's youthful indiscretion? Zackheim set off on her five-year quest for Lieserl, crisscrossing Switzerland, Germany, England, Hungary and especially Serbia. Even while bombs burst, she visited Mileva's ancestral villages, seeking her kin or anyone close to her family, including Serbian Orthodox priests and nuns...

The result is a colorful glimpse of rural Serbian culture, with its patrimonial society, strong family loyalties, female subservience, slow, leisurely discourse.

Zackheim argues that toddler was severely retarded and probably had Down syndrome. She contends that Mileva, unable to place the little girl for adoption or bend her to an orphanage, left her with her parents at their home in Serbia's rural Vojvodina region on the fertile Danube plain.

The book has produced strong reactions, both positive and negative, in the academic community."



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Hans Albert Einstein, Hydraulic and Sanitary Engineering: Berkeley

1904-1973
Professor of Hydraulic Engineering, Emeritus

Professor Hans Albert Einstein, an accomplished scholar, engineer, and teacher, was born on May 14, 1904 in Bern, Switzerland, a year before his father, Albert H. Einstein, published the *Special Theory of Relativity*. His mother, Mileva Maric, was from Serbia and was a physics student before her marriage. Professor Einstein received his elementary school education in Zurich. In 1926 he received the Diploma in Civil Engineering, and in 1936 the Doctor of Technical Sciences, both from the Swiss Federal Institute of Technology in Zurich.

For four years following the receipt of his Diploma degree, he worked in Dortmund, Germany as a steel designer. During Professor Einstein's graduate study he became deeply interested in the fundamental mechanics of the transportation of sediment by flowing water. His doctoral thesis, *Bed Load Transport as a Probability Problem* (1936), is the definitive work on sediment transportation as accepted by engineers and scientists throughout the world.

In 1927 he married Frieda Knecht of the University of Zurich, a teacher of German language and literature. One of their three children, Bernard, is a physicist, and the second, Evelyn, took her degree in anthropology. A third child, Klaus, died as a young boy shortly after the family came to the United States.

In 1938 Professor Einstein immigrated to the United States where he continued his research on the transport of sediment, first at the U.S. Agricultural Experiment Station at Clemson, South Carolina (1938-1943), and later (1943-1947) at the U.S. Department of Agriculture Cooperative Laboratory, California Institute of Technology. These years of research culminated in the classic Department of Agriculture Technical Publication No. 1026, *The Bed-Load Function for Sediment Transportation in Open Channel Flows*.

Professor Einstein joined the faculty of the University of California in 1947 as Associate Professor, and later became Professor of Hydraulic Engineering. He possessed the rare combination of a highly competent research scientist, a fine practicing engineer, and an excellent teacher in both the graduate and undergraduate areas of instruction. To recognize the many valuable contributions of Professor Einstein in research and teaching, his many former students organized in his honor a symposium on sedimentation on the Berkeley campus upon his retirement in 1970. The proceedings of this symposium resulted in the book, *Sedimentation*, in 1971.

Professor Einstein's extracurricular activities were diverse and numerous. He loved sailing and music. No day was too rough on San Francisco Bay to prevent him from heading out through the entrance of the Berkeley Yacht Harbor for a period of excitement and relaxation on the Bay.

Professor Einstein was extremely generous with his time--whether in conferences with his many graduate students, teaching for brief periods at foreign universities, or advising countries around the world on solutions to critical sedimentation problems. On one such occasion in late June 1973, he was at the Woods Hole Oceanographic Institution, Woods Hole, Massachusetts, giving lectures and participating in research when at lunch he suffered a heart attack from which he did not recover and died July 26, 1973. Early after his arrival at Woods Hole he expressed his admiration of the beauty and serenity of this small seaside town--his family therefore chose the small cemetery overlooking the harbor as his final resting place.

Widowed in 1958 by the death of his first wife, Professor Einstein married Elizabeth Roboz, then a biochemist at Stanford Medical School, and later Clinical Professor of Neurology at the University of California, San Francisco Medical Center.

By students, friends, and colleagues, Hans Albert Einstein's name will be recalled with warmth throughout the world. He offered encouragement and patient assistance to his students, and through his contacts with students, teachers, and engineers, he had great influence on the scientific development of the hydraulics of sedimentation in foreign countries as well as in the United States. As an example of the many letters received by the Department from former graduate students, one student observed, "The picture of his well built and smiling figure striding across the Hydraulic Laboratory still hovers in my mind and before my eyes. We will always cherish those sweet memories."

Among Professor Einstein's numerous honors and awards were a Guggenheim Fellowship (1953), research awards from the American Society of Civil Engineers (1959 and 1960), The Berkeley Citation from the University of California (1971), the Certificate of Merit from the U.S. Department of Agriculture (1971), and a certificate of recognition for more than twenty years of devoted and distinguished service to *Applied Mechanics Reviews* by the American Society of Mechanical Engineers (1972).

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Albert Einstein: A Jewish Myth

by Dr. Paul Bowers, B.S., M.E., Ch.D.

One of the statements of Adolf Hitler most often quoted by the Jewish media is the following from *Mein Kampf*, I:10:

> "The great masses of people ... will more easily fall victims to a big lie than to a small one."

Of course, Hitler is quoted out of context in an attempt to portray this statement as Hitler's own, personal philosophy or strategy. But if we read this selection in context, we find that he is speaking of the Jews who had ruined his country, and he is trying to explain how the German people fell victim to Jewish lies. In fact, Herr Hitler even tells us what this great lie is that duped the German people into being controlled by the Jews. He continues:

> "Those who know best this truth about the possibilities of the application of untruth and defamation, however, were at all times the Jews; for their entire existence is built on one single great lie, namely, that here one had to deal with a religious brotherhood, while in fact one has to deal with a race - what a race! As such they have been nailed down forever, in an eternally correct sentence of fundamental truth, by one of the greatest minds of mankind; he called them 'the great masters of lying.' He who does not realize this or does not want to believe this will never be able to help truth to victory in this world."

Hitler here was referring to Arthur Schopenhauer, the eminent 19th century German philosopher who was outspoken regarding the true nature of Jews. We do not need to rely upon the opinions of German philosophers and political leaders regarding this character trait of the Jews, for Jesus Christ has said of the Jews,

> **"You are of your father the Diabolical One, and the lusts of your father you wish to do. That one was a murderer from the beginning, and he has not stood in the truth because there is no truth in him. When he speaks a lie, he speaks of his own, because he is a liar, and the father of it"** (John 8:44 AST).

Furthermore, the New Testament warns us not to listen to "Judaizing myths" (Titus 1:14). But Jewish myths are exactly what destroyed Germany and what have destroyed America today. Herr Hitler may have been correct in what he felt was the greatest Jewish lie, but there are many, many more which have had a damning effect on the white race. One of the greatest is certainly the lie of the Hebrew Masoretic Text and the removal of the Greek Septuagint from the hands of white Christians, but each Jewish myth stings with the same poisonous venom. One of the great Jewish myths of the 20th century is Albert Einstein.

Albert Einstein is held up by the Jewish liars as a rare genius who drastically changed the field

of theoretical physics. As such, he is made an idol to young people and his very name has become synonymous with genius. The truth, however, is very different. The reality is that Einstein was an inept, moronic Jew who could not even tie his own shoelaces; he contributed nothing original to the field of quantum mechanics or any other science, but on the contrary he stole the ideas of other men and the Jewish media made him a hero.

When we actually examine the life of Albert Einstein, we find that his only brilliance lies in his ability to plagiarize and steal other people's ideas, passing them off as his own.

Einstein's education, or lack thereof, is an important part of this story. The *Encyclopedia Britannica* says of Einstein's early education that he "showed little scholastic ability." It also says that at the age of 15, "with poor grades in history, geography, and languages, he left school with no diploma." Einstein himself wrote in a school paper of his "lack of imagination and practical ability." In 1895, Einstein failed a simple entrance exam to an engineering school in Zurich. This exam consisted mainly of mathematical problems, and Einstein showed himself to be mathematically inept in this exam. He then entered a lesser school hoping to use it as a stepping stone to the engineering school he could not get into, but after graduating in 1900, he still could not get a position at the engineering school! Unable to go to the school as he had wanted, he got a job (with the help of a friend) at the patent office in Bern. He was to be a technical expert third class, which meant that he was too incompetent for a higher qualified position. Even after publishing his so-called groundbreaking papers of 1905 and after working in the patent office for six years, he was only elevated to a second class standing. Remember, the work he was doing at the patent office, for which he was only rated third class, was not quantum mechanics or theoretical physics, but was reviewing technical documents for patents of every day things; yet he was barely qualified.

He would work at the patent office until 1909, all the while continuously trying to get a position at a university, but without success. All of these facts are true, but now begins the Jewish myth. Supposedly, while working a full time job, without the aid of university colleagues, a staff of graduate students, a laboratory, or any of the things normally associated with an academic setting, Einstein in his spare time wrote four ground-breaking essays in the field of theoretical physics and quantum mechanics that were published in 1905. Many people have recognized the impossibility of such a feat, including Einstein himself, and therefore Einstein has led people to believe that many of these ideas came to him in his sleep, out of the blue, because indeed that is the only logical explanation of how an admittedly inept moron could have written such documents at the age of 26 without any real education. However, a simpler explanation exists: he stole the ideas and plagiarized the papers.

Therefore, we will look at each of these ideas and discover the source of each. It should be remembered that these ideas are presented by Einstein's worshippers as totally new and completely different, each of which would change the landscape of science. These four papers dealt with the following four ideas, respectively:

1. The foundation of the photon theory of light;
2. The equivalence of energy and mass;

3. The explanation of Brownian motion in liquids;
4. The special theory of relativity.

Let us first look at the last of these theories, the theory of relativity. This is perhaps the most famous idea falsely attributed to Einstein. Specifically, this 1905 paper dealt with what Einstein called the Special Theory of Relativity (the General Theory would come in 1915). This theory contradicted the traditional Newtonian mechanics and was based upon two premises: 1) in the absence of acceleration, the laws of nature are the same for all observers; and 2) since the speed of light is independent of the motion of its source, then the time interval between two events is longer for an observer in whose frame of reference the events occur at different places than for an observer in whose frame of reference the events occur in the same place. This is basically the idea that time passes more slowly as one's velocity approaches the speed of light, relative to slower velocities where time would pass faster.

This theory has been validated by modern experiments and is the basis for modern physics. But these two premises are far from being originally Einstein's. First of all, the idea that the speed of light was a constant and was independent of the motion of its source was not Einstein's at all, but was proposed by the Scottish scientist James Maxwell. Maxwell studied the phenomenon of light extensively and first proposed that it was electromagnetic in nature. He wrote an article to this effect for the 1878 edition of the *Encyclopedia Britannica*. His ideas prompted much debate, and by 1887, as a result of his work and the ensuing debate, the scientific community, particularly Lorentz, Michelson, and Morley reached the conclusion that the velocity of light was independent of the velocity of the observer. Thus, this piece of the Special Theory of Relativity was known 27 years before Einstein wrote his paper.

This debate over the nature of light also led Michelson and Morley to conduct an important experiment, the results of which could not be explained by Newtonian mechanics. They observed a phenomenon caused by relativity but they did not understand relativity. They had attempted to detect the motion of the earth through ether, which was a medium thought to be necessary for the propagation of light.

In response to this problem, in 1889, the Irish physicist George FitzGerald, who had also first proposed a mechanism for producing radio waves, wrote a paper which stated that the results of the Michelson-Morley experiment could be explained if,

> "... the length of material bodies changes, according as they are moving through the ether or across it, by an amount depending on the square of the ratio of their velocities to that of light."

This is the theory of relativity, 13 years before Einstein's paper!

Furthermore, in 1892, Hendrik Lorentz, from The Netherlands, proposed the same solution and began to greatly expand the idea. All throughout the 1890's, both Lorentz and FitzGerald worked on these ideas and wrote articles strangely similar to Einstein's Special Theory detailing what is now known as the Lorentz-FitzGerald Contraction. In 1898, the Irishman Joseph Larmor wrote down equations explaining the Lorentz-FitzGerald contraction and its relativistic consequences, 7 years before Einstein's paper. By 1904, Lorentz transformations, the series of

equations explaining relativity, were published by Lorentz. They describe the increase of mass, the shortening of length, and the time dilation of a body moving at speeds close to the velocity of light. In short, by 1904, everything in Einstein's paper regarding the Special Theory of Relativity had already been published.

The Frenchman Poincaré had, in 1898, written a paper unifying many of these ideas. He stated seven years before Einstein's paper that,

> "... we have no direct intuition about the equality of two time intervals. The simultaneity of two events or the order of their succession, as well as the equality of two time intervals, must be defined in such a way that the statements of the natural laws be as simple as possible."

Anyone who has read Einstein's 1905 paper will immediately recognize the similarity and the lack of originality on the part of Einstein. Thus we see that the only thing original about the paper was the term 'Special Theory of Relativity.' Everything else was plagiarized. Over the next few years, Poincaré became one of the most important lecturers and writers regarding relativity, but he never, in any of his papers or speeches, mentioned Albert Einstein. Thus, while Poincaré was busy bringing the rest of the academic world up to speed regarding relativity, Einstein was still working in the patent office in Bern and no one in the academic community thought it necessary to give much credence or mention to Einstein's work. Most of these early physicists knew that he was a fraud.

This brings us to the explanation of Brownian motion, the subject of another of Einstein's 1905 papers. Brownian motion describes the irregular motion of a body arising from the thermal energy of the molecules of the material in which the body is immersed. The movement had first been observed by the Scottish botanist Robert Brown in 1827. The explanation of this phenomenon has to do with the Kinetic Theory of Matter, and it was the American Josiah Gibbs and the Austrian Ludwig Boltzmann who first explained this occurrence, not Albert Einstein. In fact, the mathematical equation describing the motion contains the famous Boltzmann constant, k. Between these two men, they had explained by the 1890s everything in Einstein's 1905 paper regarding Brownian motion.

The subject of the equivalence of mass and energy was contained in a third paper published by Einstein in 1905. This concept is expressed by the famous equation E=mc^2. Einstein's biographers categorize this as "his most famous and most spectacular conclusion." Even though this idea is an obvious conclusion of Einstein's earlier relativity paper, it was not included in that paper but was published as an afterthought later in the year. Still, the idea of energy-mass equivalence was not original with Einstein.

That there was an equivalence between mass and energy had been shown in the laboratory in the 1890s by both J.J. Thomsom of Cambridge and by W. Kaufmann in Göttingen. In 1900, Poincaré had shown that there was a mass relationship for all forms of energy, not just electromagnetic energy. Yet, the most probable source of Einstein's plagiarism was Friedrich Hasenöhrl, one of the most brilliant, yet unappreciated physicists of the era. Hasenöhrl was the teacher of many of the German scientists who would later become famous for a variety of topics. He had worked on the idea of the equivalence of mass and energy for many years and

had published a paper on the topic in 1904 in the very same journal which Einstein would publish his plagiarized version in 1905. For his brilliant work in this area, Hasenörhl had received in 1904 a prize from the prestigious Vienna Academy of Sciences.

Furthermore, the mathematical relationship of mass and energy was a simple deduction from the already well-known equations of Scottish physicist James Maxwell. Scientists long understood that the mathematical relationship expressed by the equation E=mc^2 was the logical result of Maxwell's work, they just did not believe it. Thus, the experiments of Thomson, Kaufmann, and finally, and most importantly, Hasenörhl, confirmed Maxwell's work. It is ludicrous to believe that Einstein developed this postulate, particularly in light of the fact that Einstein did not have the laboratory necessary to conduct the appropriate experiments.

In this same plagiarized article of Einstein's, he suggested to the scientific community, "Perhaps it will prove possible to test this theory using bodies whose energy content is variable to a high degree (e.g., salts of radium)." This remark demonstrates how little Einstein understood about science, for this was truly an outlandish remark. By saying this, Einstein showed that he really did not understand basic scientific principles and that he was writing about a topic that he did not understand. In fact, in response to this article, J. Precht remarked that such an experiment "lies beyond the realm of possible experience."

The last subject dealt with in Einstein's 1905 papers was the foundation of the photon theory of light. Einstein wrote about the photoelectric effect. The photoelectric effect is the release of electrons from certain metals or semiconductors by the action of light. This area of research is particularly important to the Einstein myth because it was for this topic that he unjustly received his 1922 Nobel Prize.

But again, it is not Einstein, but Wilhelm Wien and Max Planck who deserve the credit. The main point of Einstein's paper, and the point for which he is given credit, is that light is emitted and absorbed in finite packets called quanta. This was the explanation for the photoelectric effect. The photoelectric effect had been explained by Heinrich Hertz in 1888. Hertz and others, including Philipp Lenard, worked on understanding this phenomenon. Lenard was the first to show that the energy of the electrons released in the photoelectric effect was not governed by the intensity of the light but by the frequency of the light. This was an important breakthrough.

Wien and Planck were colleagues and they were the fathers of modern day quantum theory. By 1900, Max Planck, based upon his and Wien's work, had shown that radiated energy was absorbed and emitted in finite units called quanta. The only difference in his work of 1900 and Einstein's work of 1905 was that Einstein limited himself to talking about one particular type of energy - light energy. But the principles and equations governing the process in general had been deduced by Planck in 1900. Einstein himself admitted that the obvious conclusion of Planck's work was that light also existed in discrete packets of energy. Thus, nothing in this paper of Einstein's was original.

After the 1905 papers of Einstein were published, the scientific community took little notice and Einstein continued his job at the patent office until 1909 when it was arranged for him to take a position at a school by World Jewry. Still, it was not until a 1919 newspaper headline that he gained any notoriety.

With Einstein's academic appointment in 1909, he was placed in a position where he could begin to use other people's work as his own more openly. He engaged many of his students to look for ways to prove the theories he had supposedly developed, or ways to apply those theories, and then he could present the research as his own or at least take partial credit. In this vein, in 1912, he began to try and express his gravitational research in terms of a new, recently developed calculus, which was conducive to understanding relativity. This was the beginning of his General Theory of Relativity, which he would publish in 1915. But the mathematical work was not done by Einstein - he was incapable of it. Instead, it was performed by the mathematician Marcel Grossmann, who in turn used the mathematical principles developed by Berhard Riemann, who was the first to develop a sound non-Euclidean geometry, which is the basis of all mathematics used to describe relativity.

The General Theory of Relativity applied the principles of relativity to the universe; that is, to the gravitational pull of planets and their orbits, and the general principle that light rays bend as they pass by a massive object. Einstein published an initial paper in 1913 based upon the work which Grossmann did, adapting the math of Riemann to Relativity. But this paper was filled with errors and the conclusions were incorrect. It appears that Grossmann was not smart enough to figure it out for Einstein. So Einstein was forced to look elsewhere to plagiarize his General Theory. Einstein published his correct General Theory of Relativity in 1915, and said prior to its publication that he, "...completely succeeded in convincing Hilbert and Klein." He is referring to David Hilbert, perhaps the most brilliant mathematician of the 20th century, and Felix Klein, another mathematician who had been instrumental in the development of the area of calculus that Grossmann had used to develop the General Theory of Relativity for Einstein.

Einstein's statement regarding the two men would lead the reader to believe that Einstein had changed Hilbert's and Klein's opinions regarding General Relativity, and that he had influenced them in their thinking. However, the exact opposite is true. Einstein stole the majority of his General Relativity work from these two men, the rest being taken from Grossmann. Hilbert submitted for publication, a week before Einstein completed his work, a paper which contained the correct field equations of General Relativity. What this means is that Hilbert wrote basically the exact same paper, with the same conclusions, before Einstein did. Einstein would have had an opportunity to know of Hilbert's work all along, because there were Jewish friends of his working for Hilbert. Yet, even this was not necessary, for Einstein had seen Hilbert's paper in advance of publishing his own. Both of these papers were, before being printed, delivered in the form of a lecture.

Einstein presented his paper on November 25, 1915 in Berlin and Hilbert had presented his paper on November 20 in Göttingen. On November 18, Hilbert received a letter from Einstein thanking him for sending him a draft of the treatise Hilbert was to deliver on the 20th. So, in fact, Hilbert had sent a copy of his work at least two weeks in advance to Einstein before either of the two men delivered their lectures, but Einstein did not send Hilbert an advance copy of his. Therefore, this serves as incontrovertible proof that Einstein quickly plagiarized the work and then presented it, hoping to beat Hilbert to the punch. Also, at the same time, Einstein publicly began to belittle Hilbert, even though in the previous summer he had praised him in an effort to get Hilbert to share his work with him. Hilbert made the mistake of sending Einstein

this draft copy, but still he delivered his work first.

Not only did Hilbert publish his work first, but it was of much higher quality than Einstein's. It is known today that there are many problems with assumptions made in Einstein's General Theory paper. We know today that Hilbert was much closer to the truth. Hilbert's paper is the forerunner of the unified field theory of gravitation and electromagnetism and of the work of Erwin Schrödinger, whose work is the basis of all modern day quantum mechanics.

That the group of men discussed so far were the actual originators of the ideas claimed by Einstein was known by the scientific community all along. In 1940, a group of German physicists meeting in Austria declared that "before Einstein, Aryan scientists like Lorentz, Hasenöhrl, Poincaré, etc., had created the foundations of the theory of relativity..."

However, the Jewish media did not promote the work of these men. The Jewish media did not promote the work of David Hilbert, but instead they promoted the work of the Jew Albert Einstein. As we mentioned earlier, this General Theory, as postulated by Hilbert first and in plagiarized form by Einstein second, stated that light rays should bend when they pass by a massive object. In 1919, during the eclipse of the Sun, light from distant stars passing close to the Sun was observed to bend according to the theory. This evidence supported the General Theory of Relativity, and the Jewish-controlled media immediately seized upon the opportunity to prop up Einstein as a hero, at the expense of the true genius, David Hilbert.

On November 7th, 1919, the London *Times* ran an article, the headline of which proclaimed, "Revolution in science - New theory of the Universe - Newtonian ideas overthrown." This was the beginning of the force-feeding of the Einstein myth to the masses. In the following years, Einstein's earlier 1905 papers were propagandized and Einstein was heralded as the originator of all the ideas he had stolen. Because of this push by the Jewish media, in 1922, Einstein received the Nobel Prize for the work he had stolen in 1905 regarding the photoelectric effect.

The establishment of the Einstein farce between 1919 and 1922 was an important *coup* for world Zionism and Jewry. As soon as Einstein had been established as an idol to the popular masses of England and America, his image was promoted as the rare genius that he is erroneously believed to be today. As such, he immediately began his work as a tool for World Zionism. The masses bought into the idea that if someone was so brilliant as to change our fundamental understanding of the universe, then certainly we ought to listen to his opinions regarding political and social issues. This is exactly what World Jewry wanted to establish in its ongoing effort of social engineering. They certainly did not want someone like David Hilbert to be recognized as rare genius. After all, this physicist had come from a strong German, Christian background. His grandfather's two middle names were 'Fürchtegott Leberecht' or 'Fear God, Live Right.' In August of 1934, the day before a vote was to be taken regarding installing Adolf Hitler as President of the Reich, Hilbert signed a proclamation in support of Adolf Hitler, along with other leading German scientists, that was published in the German newspapers. So the Jews certainly did not want David Hilbert receiving the credit he deserved.

The Jews did not want Max Planck receiving the credit he deserved either. This German's grandfather and great-grandfather had been important German theologians, and during World War II he would stay in Germany throughout the war, supporting his fatherland the best he

could.

The Jews certainly did not want the up-and-coming Erwin Schrödinger to be heralded as a genius to the masses. This Austrian physicist would go on to teach at Adolf Hitler University in Austria, and he wrote a public letter expressing his support for the Third Reich. This Austrian's work on the unified field theory was a forerunner of modern physics, even though it had been criticized by Einstein, who apparently could not understand it.

The Jews did not want to have Werner Heisenberg promoted as a rare genius, even though he would go on to solidify quantum theory and contribute to it greatly, as well as develop his famous uncertainty principle, in addition to describing the modern atom and nucleus and the binding energies that are essential to modern chemistry. No, the Jews did not want Heisenberg promoted as a genius because he would go on to head the German atomic bomb project and serve prison time after the war for his involvement with the Third Reich.

No, the Jews did not want to give credit to any of a number of white Germans, Austrians, Irishmen, Frenchmen, Scotsmen, Englishmen, and even Americans who had contributed to the body of knowledge and evidence from which Einstein plagiarized and stole his work. Instead, they needed to erect Einstein as their golden calf, even though he repeatedly and often embarrassed himself with his nonfactual or nearsighted comments regarding the work he had supposedly done. For example, in 1934, the *Pittsburgh Post-Gazette* ran a front page article in which Einstein gave an "emphatic denial" regarding the idea of practical applications for the "energy of the atom." The article says,

> "But the 'energy of the atom' is something else again. If you believe that man will someday be able to harness this boundless energy-to drive a great steamship across the ocean on a pint of water, for instance-then, according to Einstein, you are wrong..."

Again, Einstein clearly did not understand the branch of physics he had supposedly founded, though elsewhere in the world at the time theoretical research was underway that would lead to the atomic bomb and nuclear energy. But after Einstein was promoted as a god in 1919, he made no real attempts to plagiarize any other work. Rather, he began his real purpose - evangelizing for the cause of Zionism and World Jewry. Though he did publish other articles after this time, all of them were co-authored by at least one other person, and in each instance, Einstein had little if anything to do with the research that led to the articles; he was merely recruited by the co-authors in order to lend credence to their work. Thus freed of the pretense of academia, Einstein began his assault for World Zionism.

In 1921, Einstein made his first visit to the United States on a fund-raising tour for the Hebrew University in Jerusalem and to promote Zionism. In April of 1922, Einstein used his status to gain membership in a Commission of the League of Nations. In February of 1923, Einstein visits Tel Aviv and Jerusalem. In June of 1923, he becomes a founding member of the Association of Friends of the New Russia. In 1926, Einstein took a break from his Communist and Zionistic activities to again embarrass himself scientifically by criticizing the work of Schrödinger and Heisenberg. Following a brief illness, he resumes his Zionistic agenda, wanting an independent Israel and at the same time a World Government.

In the 1930s he actively campaigns against all forms of war, although he would reverse this position during World War II when he advocated war against Germany and the creation of the atomic bomb, which he thought was impossible to build. In 1939 and 1940, Einstein, at the request of other Jews, wrote two letters to Roosevelt urging an American program to develop an atomic bomb to be used on Germany - not Japan. Einstein would have no part in the actual construction of the bomb, theoretical or practical, because he lacked the skills for either.

In December of 1946, Einstein rekindles his efforts for a World Government, with Israel apparently being the only autonomous nation. This push continues through the rest of the 1940s. In 1952, Einstein, who had been instrumental in the creation of the State of Israel, both politically and economically, is offered the presidency of Israel. He declines. In 1953, he spends his time attacking the McCarthy Committee, and he supports Communists such as J. Robert Oppenheimer. He encourages civil disobedience in response to the McCarthy trials. Finally, on April 18, 1955, this filthy Jewish demagogue dies.

Dead, the Jews no longer had to worry about Einstein making stupid statements. His death was just the beginning of his usage and exploitation by World Jewry. The Jewish-controlled media continued to promote the myth of this Super-Jew long after his death, and as more and more of the men who knew better died off, the Jews were more and more able to aggrandize his myth and lie more boldly. This brazen lying has culminated in the Jew controlled *Time* magazine naming Einstein "The Person of the Century" at the close of 1999. It may be demonstrated that the Jewish lies have become more bold with the passage of time because Einstein was never named "Man of the Year" while he was alive, but now, over forty years after his death, he is named "Person of the Century."

Einstein was given this title in spite of the clear-cut choice for the "Person of the Century," Adolf Hitler. Hitler was indeed named "Man of the Year" while he was still living by *Time* magazine, and according to a December 27, 1999, article in the *USA Today*, Einstein was chosen over Adolf Hitler because of the perceived "nasty public relations fallout" that would accompany that choice; yet in internet polling by *Time,* Hitler finished third and was the top serious candidate. Still the issue of *Time* magazine dedicated to Einstein, which has articles by men with names like Isaacson, Golden, Stein, Rudenstine, and Rosenblatt, is interesting to read. For one, they found it necessary to include an article rationalizing why they did not pick the obvious choice, Adolf Hitler. But more interesting is the article by Stephen Hawking which purports to be a history of the theory of relativity. In it, Hawking admits many of the things in this article, such as the fact that Hilbert published the General Theory of Relativity before Einstein and that FitzGerald and Lorentz deduced the concept of relativity long before Einstein. Hawking also writes,

> "Einstein...was deeply disturbed by the work of Werner Heisenberg in Copenhagen, Paul Dirac in Cambridge and Erwin Schrödinger in Zurich, who developed a new picture of reality called quantum mechanics. ... Einstein was horrified by this ... Most scientists, however, accepted the validity of the new quantum laws because they showed excellent agreement with observations ... They are the basis of modern developments in chemistry, molecular biology and electronics and the foundation of the technology that has transformed the world in the past half-century."

This is all very true, yet the same magazine credits Einstein with all of the modern developments that Hawking names, even through Einstein was so stupid as to be vehemently against the most important idea of modern science, just as he opposed Schrödinger's work in unified field theory which was far ahead of its time. The same magazine admits that "success eluded" Einstein in the field of explaining the contradictions between relativity and quantum mechanics. Today, these contradictions are explained by the unified field theory, but Einstein, who proves himself to be one of the least intelligent of 20th century scientists, refused to believe in either quantum theory or the unified field theory.

To name Einstein as "The Person of the Century" is one of the most ludicrous and absurd lies of all time, yet it has been successfully pulled off by Isaacson, Golden, Stein, Rudenstine, and Rosenblatt and the Jewish owners of *Time* magazine. If the Jews at *Time* wanted to give the title to an inventor or scientist, then the most obvious choice would have been men like Hilbert, Planck, or Heisenberg. If they wanted to give it to the scientist who most fundamentally changed the landscape of 20th century science, then the obvious choice would be William Shockley. This Nobel prize winning scientist invented the transistor, which is the basis of all modern electronic devices and computers, everything from modern cars and telephones, VCRs and watches, to the amazing computers which have allowed incomprehensible advances in all fields of science. Without the transistor, all forms of science today would be basically in the same place that they were in the late 1940s.

However, the Jews cannot allow the due credit to go to William Shockley because he spent the majority of his scientific career demonstrating the genetic and mental inferiority of non-whites and arguing for their sterilization. His scientific, genetic views led the Jews to financially destroy Shockley who founded the first company in the Silicon Valley, his hometown, to develop computer chips. The Jews hired away his entire staff and used them to start Fairchild semiconductor, the company that today is known as Intel.

No the Jews could not let any of the truly great geniuses of our time be recognized, not the anti-Semite Henry Ford, not the great German scientists who helped the National Socialists in Germany, not Charles Lindbergh, who was sympathetic to National Socialist causes, and certainly not William Shockley, one of the most brilliant physicists and geneticists of our time. Instead, the Jews propped up the Zionist, Communist Albert Einstein who hated everything white.

After World War II, Einstein demonstrated his hatred of the White Race and of the Germans in particular in the following statements. He was asked what he thought about Germany and about re-educating the Germans after the war and said,

> "The nation has been on the decline mentally and morally since 1870...Behind the Nazi party stands the German people, who elected Hitler after he had in his book and in his speeches made his shameful intentions clear beyond the possibility of misunderstanding. ... The Germans can be killed or constrained after the war, but they cannot be re-educated to a democratic way of thinking and acting..."

Einstein here is advocating the murder of Germans, because he feels that this is the only way

that they can be kept in check. He is right about one thing, the Germans did knowingly support the cause of National Socialism, but what Einstein is attacking is Christianity, because it was Christianity that led the German people to overwhelmingly support National Socialism. It was the German Christian Faith Movement and the Christian Social Party of men like Karl Lueger that led the German people to their understanding of Jews. The Jew Daniel Goldhagen has recently shown the Christian basis of National Socialism in his book, *Hitler's Willing Executioners: Ordinary Germans and the Holocaust,* and the book *Why The Jews?* by Prager and Telushkin similarly proves the Christian origins of what the Jews call 'anti-Semitism.' Einstein understood this and Einstein, like all Jews, hated Christianity. So what Einstein was really advocating was the killing and constraining of all true Christians, not just German Christians. This is the true purpose and intent of Zionism and the demagogue Einstein was merely a tool of World Zionism and Jewry towards this end.

Zionistic Jews understand that true, primitive Christianity is the mortal enemy of mongrel Judaism. This is why the Jews, like Einstein, hated Nazi Germany so much, for National Socialist Germany advocated primitive, positive Christianity in the 24th point of its Party Platform.

For more information, contact:

CSCS, P.O. Box 188, Kodak, TN 37764

www.christianseparatist.org

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Metaphysics, Metamath ILLUCID

2003 Jun 19

... *physics* . *metaphysics* . *electromagnetism* . *Einstein was wrong* . *mathematics* ...

> "I want to talk about a technical subject, but the fastest way to destroy curiosity is to delve into a series of apparently unconnected facts. I want to present an alternative interpretation of the math underlying our current physics; an interpretation in which space is a tangible substance; where atoms are a type of oscillating singularity; where the universe we live in is a mere bubble of mass protruding from someone else's black hole. I want to connect interactions that happen on scales far smaller than a photon with causes that have their beginnings in the creation of the universe. Most of all, I want to instigate insight."

Utele Group 2003 Apr 09 CRANKY

... *physics* . *quantum mechanics* . *relativity* . *Einstein was wrong* ...

> "Standard conception of physics concerning quarks can be forgotten -- there are no quarks as particles! The three theories concerning the birth of the universe ... The new Theory of Time discovered by Utele. The Space-Time physics of Einstein is false?"

Shade Tree Physics 2003 CRANKY

Mar 10

... *physics* . *relativity* . *Einstein was wrong* . *medicine* . *Velikovsky* ...

> "Arrows of time ... Astronomer's theme song ... Bending water ... Cosmoogical redshift ... Don't go to 3-D movies! ... Electrical lifting of water ... Galilean relativity ... General electrodynamics ... Influenza 1918, a Venus connection? ... The Ritz-Einstein agreement to disagree ... Grappling with science's limits ... Velikovsky pages ... West Nile virus ..."

Rene's Domain **2003 Jan 21** CRANKIEST

... *Apollo program* . *September 11* . *Einstein was wrong* . *physics* . *mathematics* ...

> "Rene, is the last name of a mostly self taught 'extra bright kid from the slums,' who says he was 'a victim of a plot of Byzantine proportions in the second grade.' It involved a 'conspiracy between his mother and his grammar school teachers' and resulted in his being skipped a grade. This placed him in 'the glorious position of always being the youngest, smallest and brightest kid in the class.' Transferred to a new school in the fourth grade, he subsequently 'became an anathema to his teachers.' ... Over a decade ago, the Rand Corporation contacted him pleading for contributions of free inventions or thoughts relating to space for NASA. ... y that time he had begun to have severe doubts that NASA's Apollo program's had ever landed men on the Moon. ... Don't you agree that as a 'former' consultant to NASA and the Rand Corporation that his credentials are impeccable?" *Of course, he'd be glad to share his ideas with you ... for a price.*

Physics FAQ/Criticism CRANKIEST

2003 Jan 21

... *Einstein was wrong* . *Usenet kooks* ...

> "Einstein (1905) Absurdities ... Unknown Functions & Einstein's Incompetence ... Invariant Galilean Transformations (FAQ) On All Laws ... (SR) Lorentz t', x' = Intervals ..."

The Alternate Theory of Relativity **2002 Nov 16** CRANKY

... *Einstein was wrong* ...

> "Given the information Einstein had, he could have created an entirely different theory of relativity. One that satisfied both general relativity and the recent experiments in optics which suggested that light traveled at a set speed. What you are about to read is a summed up version of the alternate theory of relativity by Brent Cowan. In writing this I assume that

the reader has a good understanding of Einstein's theory."

General Theory of Relative Motions 2002 Sep 19

CRANKIER

... *relativity* . *Einstein was wrong* ...

"This posting contains 38 pages, there is much more in the complete manuscript. Please feel free to print a copy for easy reading. There is enough here to describe how nature really works. LOGICALLY. For purchase of first complete copy for general public as collector's item." *Available in Microsoft Word format.*

The Theory of Relativity Is Wrong 2002 Aug 17

CRANKIER

... *relativity* . *Einstein was wrong* . *aether* ...

"This paper elaborates on three new experiments, namely: 1. The experiment of two aircraft. 2. The aircraft experiment through the emission of electromagnetic wave train of a specific length, and 3. The GL experiment. The objective of these three experiments is to prove *once more* whether the Theory of Relativity is accurate or false, and more precisely, to demonstrate whether both postulates of the Special Theory of Relativity are valid. In essence, these three experiments will demonstrate the existence or non-existence of ether, and more precisely of the etherosphere which surrounds the Earth; in general, they will set out to prove whether every celestial body is surrounded by an etherosphere or not. These three experiments are of great importance to Physics, for their outcome will enable us to assert once more whether our knowledge of Physics is well founded or not. I hope that the 'Experts' will comprehend the paramount importance of these three experiments and that they will proceed with their realization. So many experiments have been carried out so far in order to prove the 'accuracy' of the Theory of Relativity. We have nothing to lose by conducting another three. After

all, one has to bear in mind that to dare and to constantly doubt are fundamental to Scientific Research." *In English and Greek. In PDF and HTML formats.*

Primordiality **2002 May 27** CRANKIEST

... *physics* . *consciousness* . *quantum mechanics* . *Einstein was wrong* . *metaphysics* ...

"When I was twelve years old, late one night while struggling through my homework with the gods of general math and Euclidean geometry, it came to me. I drew an equilateral triangle and then another inverted inside of the first and I immediately saw that the inverted triangle was exactly one half the size of the first and so I drew another inside of that and then another. I then drew a circle around each triangle and then quite unexpectedly, like an electrical flash, Zeno's Paradox rent my linear thought asunder to reveal in all of its elliptical glory a vortex of irrational numbers and every element of the attractive and opposing relationships between Space, Time, Matter, Energy and Motion. From that time forward I found no rest ..the quest of a lifetime had begun."

The Speed of Gravity: What the Experts Say CRANKIEST

2002 Apr 21

... *gravitation* . *Einstein was wrong* ...

"Standard experimental techniques exist to determine the propagation speed of forces. When we apply these techniques to gravity, they all yield propagation speeds too great to measure, substantially faster than lightspeed. This is because gravity, in contrast to light, has no detectable aberration or propagation delay for its action, even for cases (such as binary pulsars) where sources of gravity accelerate significantly during the light time from source to target By contrast, the finite propagation speed of light causes radiation pressure forces to have a non-radial component causing orbits to decay (the 'Poynting-Robertson effect'); but gravity has no counterpart force

proportional to *v*/*c* to first order. General relativity explains these features by suggesting that gravitation (unlike electromagnetic forces) is a pure geometric effect of curved space-time, not a force of nature that propagates. Gravitational radiation, which surely does propagate at lightspeed but is a fifth order effect in *v*/*c*, is too small to play a role in explaining this difference in behavior between gravity and ordinary forces of nature."

The Absolute Present

CRANKIEST

2001 Nov 18

... *relativity* . *Einstein was wrong* ...

"More than an intuitive nonsense, Einstein's Theory of Special Relativity, it would seem, legitimised a century of stupidity. A stupidity typified by schizophrenic, ghosting, time dependent, self-replicating, psychic 'god-like' particles; singularities; space-time warps and imaginary time. If sensibility is to be restored, then Science must exorcise the spooks, God-rationalists, and writers of science fiction that riddle modern theoretical physics. Provocative conjecture indeed. The motivation for such conjecture has root in the ultimate beauty of simplicity -- the analysis of the empirical data in the context of a new 'intuitive' theoretical model. Consequently, this work is not so much about an ultimate objective truth of physical theory or the philosophy of time, but is more a quest for re-evaluation in the face of esoteric, complex theories founded upon the 'near mystical.'"

All My Files **2001 Oct 09**

CRANKIEST

... *metaphysics* . *technology* . *relativity* . *Einstein was wrong* . *physics* . *mathematics* ...

"The Dark Matter mystery ... Modifications of the strong nuclear force by the action of the zero-point force ... Einstein's twin paradox revisited ... Non-accelerated 'twin paradox' ... Single best argument against special relativity ... Simple challenge to supporters of special

relativity ... Short *reductio ad absurdum* refutation of special relativity ... Another simple argument against special relativity ... Logical invalidity of Einstein's 'train' thought experiment ... Do the Lorentz transformations even do what they were intended to do? ... Does the Michelson-Morley experiment *really* indicate that the speed of light is a constant? ... Can mass *really* increase with velocity ... ? ... Contradiction between the special and general theories of relativity ... A short and sweet refutation of Gödel's theorem ..." *In PDF, Word, and RTF formats.*

The Einstein Conspiracy CRANKIEST

2001 Oct 09

... *relativity* . *Einstein was wrong* . *conspiracy* . *history* ...

"I have researched relativity theory and written a book ... The book deals with my maths investigation of orthodox physics, this Web site goes beyond the book. There is now no need to look at the maths of orthodox physics to show it to be wrong, because its history can be shown to be a myth."

Quotes Direct from the Brain Trust Videos 2001 ILLUCID

Aug 11

... *gravitation* . *Einstein was wrong* . *megalomaniacs* ...

"Gravity as Newton and Einstein knew it does not exist. You have to go back at least 15 years when they put gravitometers down oil wells about six miles deep to test the gravitational constant at that level. According to Newton and Einstein, it should be a certain specific quantity or within a small range. In fact, they found out that there is something like a hundred times as much gravity and that's ridiculous, they said. When the United States launched the first space probe it kept going off course. Well, it took them awhile to re-analyze all the evidence and what they came up with is that gravity does not exist in space as they

thought it did -- there's less than 1percent of the amount of gravity that there should be. So gravity as Newton and Einstein knew it works from about five miles under the earth up to about three-hundred miles above the earth. Thus, gravity is not what anyone ever thought it to be."

Time-Line-Theory 2001 Aug 11 CRANKY

... *Einstein was wrong* . *relativity* ...

"This theory is to say matter of the universe has a constant time (speed) to it. Matter can't go slower than the time constant for matter, but it can go faster than the time constant. For every 1 mile matter moves in the universe, time moves 3647 miles."

The Theory of Absolute Space-Time 2001 Jul 21 CRANKIEST

... *Einstein was wrong* . *relativity* . *aether* . *quantum mechanics* . *grand unification* ...

"The discovery of errors in our measurement of a constant speed of light and in the logic of the Michelson-Morley experiment leads to a complete refutation of Einstein's [relativity's] curved space-time. Proof of absolute space-time within 'our' universe leads to linear and finite dimensions of space-time. Theoretical physics leads us to quantum gravity and a grand unified theory. A quantum particle 'theory of everything.' The speed of light is no longer a travel speed restriction."

Yun-Qi Kingdom 2001 Jun 10 CRANKIEST

... *science* . *physics* . *mathematics* . *relativity* . *Einstein was wrong* . *hoaxes* . *paranormal* . *astronomy* . *gravitation* . *metaphysics* . *conspiracy* . *new age* ...

"When the new millennium begins, a great NEW KINGDOM also comes. It marks the END of SCIENCE. No matter whether you believe or not, no matter if you want or not, this is already a fact, and will definitely become the reality in the very near future. Actually, my first article 'Yun-Qi Kingdom -- Fundamental One'

obviously has very well put today's PHYSICS into the DEAD END. Students, teachers and professors who have a solid background of mathematics and/or physics can easily examine what I say by yourselves. If you think my first article does not sufficiently shake down today's MATHEMATICS, my second incoming article 'Yun-Qi Kingdom -- Fundamental Two' will clearly show you that the MATHEMATICS we have used for centuries is also considerably and lawlessly WRONG. Please do not use today's knowledge as your prejudices to cut immediately what I have said down. Try to investigate it first. I hope one can beat Yun-Qi Kingdom down by using today's science and knowledge, but I'll be afraid to say that NOBODY CAN."

Big Bang and Black Hole [sic] are Science Fiction **2001 Feb 05**

CRANKY

... *Big Bang* . *gravitation* . *Einstein was wrong* ...

"The Yilmaz theory of gravity is an extension of the Einstein general theory of relativity. Since 1958, Prof. Huseyin Yilmaz has published numerous papers on his theory in prestigious scientific journals. The Einstein theory has a flaw that was not apparent during Einstein's lifetime. The Yilmaz theory has corrected this flaw, and has thereby eliminated the 'singularity' concept of the big bang and black hole, which Einstein strongly opposed. This website explains the Einstein and Yilmaz theories in a simple physical manner that is scientifically accurate. The Yilmaz theory yields a radically new explanation for the Hubble expansion of the universe. The theory predicts that relativistic effects due to gravity distort space in such a manner that the universe expands locally about every point, yet the overall size of the universe does not change. The theory predicts a universe with a constant size and an infinite age, which appears to be eternally young because it is continually changing."

Did Einstein cheat? 2000 Nov 18

anticrank

... *Einstein was wrong* . *crankology* ...

"If you're tired of hearing about creationists and the war against Darwinism, you might be surprised to learn that another pillar of modern science, Einstein and his theory of relativity, is under attack. An underground of 'dissident' scientists and self-described experts publish their theories in newsletters and on the Web, exchanging ideas in a great battle against 'the temple of relativity.' According to these critics, relativity is not only wrong, it's an affront to common sense, and its creator, Albert Einstein, was a cheat."

Gravity as resistance to heat flow 2000 Aug 13

CRANKY

... *Einstein was wrong* . *thermodynamics* ...

"A heat-based gravity theory has been developed in order to account for a number of anomalies related to the mass-based gravity theories of Newton and Einstein. A fundamental assumption of this theory that the gravitational force will come into being whenever heat flows through curved surface like a hemisphere. This idea has been tested in the laboratory."

Flaws in the Logic of Einstein's Special Theory of Relativity 2000 Jun 04

CRANKY

... *Einstein was wrong* ...

"Scientific theories usually sprout from experiment-based logical grounds. New theories must replace the existing ones if they do not agree with the results of experiments. A new theory has to be in full agreement with the fundamental laws of nature and it has to include in itself the old theory as an exception. Therefore, if the new theory's logic is flawed then the theory itself must be wrong. Let us use this premise to examine Einstein's Special Theory of Relativity."

Paul Marmet: List of Papers and Web Sites

CRANKY

2000 May 05

... *Einstein was wrong* . *Big Bang* . *cosmology* . *quantum mechanics* ...

> "Einstein's theory of relativity versus classical mechanics ... A detailed classical description of the advance of the perihelion of Mercury ... Absurdities in modern physics: A solution ... Big Bang cosmology meets an astronomical death ... The origin of the 3 K radiation ... Quantum mechanics and its paradox ... Non-Doppler redshift of some galactic objects ... Incompatibility between Einstein's general relativity and the principle of equivalence ... Cosmic matter and the nonexpanding Universe ... The 3 K microwave background and Olbers' paradox ... The cosmological constant and the redshift of quasars ..."

New Transformation Equations and the Electric Field Four-vector

CRANKY

2000 Mar 01

... *Einstein was wrong* . *electromagnetism* ...

> "In special relativity, Einstein introduced two postulates: The first postulate is that the speed of light is invariant for all inertial observers. In this theory, unlike in relativity, we use a Euclidean metric to describe spacetime, leading to a redefinition of the invariance of the speed of light in terms of a four-vector, rather than a three-vector. The second postulate of relativity is that the laws of physics are the same for all inertial observers. This requires that the laws have a covariant form under a Lorentz transformation between inertial reference frames. Our intention is to show that the Lorentz equations are incomplete. Since these equations are used to determine the covariance of the laws of physics, any change in their form requires a change in the form and scope of these laws. We will introduce the new version of the Lorentz transformation equations and some of its

consequences."

Beyond the Farthest Star 2000 Jan 10

CRANKIEST

... *Einstein was wrong* . *electromagnetism* ...

"'Beauty is truth, truth beauty, that is all ye know on earth, and all ye need to know.' If the poet is right, the book *Beyond the Farthest Star* is the most beautiful book ever written. Considering firty [sic] years of opposition to anything sennsible [sic], it is to be hoped that the book will set the record straight. In terms of the future of mankind, the present system based on the work of Euclik [sic], Galileo, Newton, and Einstein is fatally flawed. Present physics can be trusted for mechanical velocities but diverges from reality beyond one tenth the velocity of light."

Caroline Thompson's Physics 1999 Nov 04

CRANKY

... *Einstein was wrong* . *quantum mechanics* . *physics* ...

"... is about what is wrong with fundamental physics. It started with the discovery that we have been misled. We have been told that experiments agree with *all* the predictions of quantum theory, including those that involve the impossible -- the Einstein-Podolsky-Rosen experiments, that are supposed to show totally incomprehensible effects of separated particles on each other. I have looked at the evidence. ... I am led to suggest that perhaps there is other currently-accepted 'evidence' for both quantum theory and Einstein's relativity theories that needs re-investigation. I am not talking of 're-interpretation,' but of recognizing that if we want to understand nature, not just produce 'predictions,' the first step is to re-assess the facts, reject falsehoods."

Plank [sic] units 1999 Oct 29

ILLUCID

... *Einstein was wrong* . *quantum mechanics* . *electromagnetism* . *medicine* ...

"The theory of gravitation of the Newton-Einstein [sic] may be incorrect ... Fundamental Plank [sic] particles ... Photon has closed world ... The nature of physical vacuum ... The birth and evolution of the Universe ... The cause of cancer ..."

Flat Space Society 1999 Oct 12 CRANKY

... *Einstein was wrong* . *gravitation* ...

"This society is modelled on the 'Flat Earth Society.' Einstein is to blame for starting all this 'curved space' talk. Everybody knows space is 'flat.' Newton and Einstein didn't know what gravity is, and nobody knows to this day. ... Use Riemannian curved geometry, but that still doesn't explain the real physical mechanism of gravity. I maintain space is 'flat' (Newtonian) and we'd better start finding out what gravity really is, especially if we want to find a better way of defeating it to accomplish realistic space travel."

Einstein Is Really Wrong! 1999 Aug 21 CRANKY

... *Einstein was wrong* ...

"This Web site is intended to be an additional means to help the few intelligent physicists in the world who battle against the injustified religious primacy among the scientific community of the logically impossible relativistic Einstein's theories [sic]."

Weight, Inertia, & Gravity 1999 May 27 CRANKY

... *gravitation* . *Einstein was wrong* ...

In forming his The General Theory of Relativity, Albert Einstein used his famous thought experiments to justify his postulate that Inertia and Gravity are equivalent. Although they are closely related they are not equivalent. Inertia is a requirement of space. Gravity is one of the primary forces of nature that fulfils this requirement. The force of gravity

arises from the "mass" created by the Inertial requirement of Space. One of the ideas that misled Einstein to his conclusion was that a body dropped in an accelerating elevator behaved in exactly the same manner as it would if dropped on the surface of Earth. Actually, the effects, in both cases, are similar but not exactly the same. The truth is, Gravity causes bodies, dropped from various heights in the room resting on the ground, to fall at different rates of acceleration where as, all bodies in the accelerating elevator "fall" at the same rate. Also they do not "fall" parallel to each other under the influence of gravity as they do in an accelerating room.

The Society for the Advancement of Autodynanmics

CRANKIEST

1999 May 27

... *Einstein was wrong* . *relativity* ...

"In 1940, a young future physicist from Argentina came across a paradox in Einstein's Special Relativity that lead him to discover a theory of physics that Einstein came close to, but never found: a theory he called 'Autodynamics.'"

Einstein and Relativity

CRANKY

1999 May 27

... *Einstein was wrong* ...

"It is clear to me that Mr. Einstein's special theory of relativity is flawed because of faulty reasoning. Now there are those who will say that I am speaking nonsense because Mr. Einstein's theory has been 'proven' over and over again."

Search Now!
Einstein was
GO!
amazon.com.

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The Alcyone Systems Web Ring (13 sites) >>>

[Alcyone Systems | Erik Max Francis | Blackgirl International | Bosskey.net | Alcyone Systems' CatCam | **Crank dot Net** | Hard Science | Losers dot Org | Max Pandaemonium | Polly Wanna Cracka? | Realpolitik | sade deluxe | 7 Sisters Productions]

Erik Max Francis

The homepage of Erik Max Francis.

Hard Science

Hard science, the easy way.

http://groups.google.com/groups?q=Einstein+Emperor&hl=en&lr=&safe=off&rnum=1

Einstein and Emperor's new cloths

Einstein was the smartest person in the world. I am so impressed that I try to read everything about Einstein.. The more I've read, the more I have questions.

How come he gets so much fame? How come he gets all the name and credit even though some other scientists should get more then him?

(Question 1)
How come when people discover something, they always like to make a connection with Einstein and give their credit to Einstein?

(question2)
How come Einstein say "yes" then say "no". Either way, "yes" people or "no" people both believe Einstein is right and both give credit to Einstein?

(question 3)How come when people discover something, which even does not mention Einstein's name nor relativity, people still make a connection with relativity and give credit to Einstein? Even Einstein himself would be surprised.

(question 4)I raised some equations to be open discussion to clear my thoughts.

1. From what I read, Lorentz transformation is the first instance to assume the speed of light is constant. And measure of time and distance very systematically as anything moves relative to anything else. These concepts were created by Lorentz, not Einstein. Einstein may use the common language to interpret these concepts and call it another name "special relativity". Everything derived from special relativity are based on Lorentz transformations. So the packaging may belong to Einstein, but the content belongs to Lorentz. When you hear famous "where is the beaf". We should know that content is more important than packaging. In my opinion, Lorentz should be called the father of special relativity not Einstein. How come Einstein gets all the credit, but Lorentz gets nothing? 98% percent of people in the world do not know who is the guy called "Lorentz", but 100% of people know Einstein. It is not fair. Besides, for the 1912 Nobel prize in physics, Lorentz is the major winner and Einstein took place in second. I don't think many people know that, too. In 1912, when Lorentz was selected to win the 1912 Nobel Prize, Wien, the winner of 1911 who recommended Einstein says

While Lorentz must be considered as the first to have found the mathematical content of the relativity principle. Einstein succeeded in reducing it to a simple principal. One should therefore assess the merit of both investigators as being comparable...

2. At first, Einstein said the Universe is static with cosmological constant. He cannot prove it only mention it. In 1930, when Hubble prove that the galaxies actually moving away from the earth, Einstein changed his mind and believed Universe is expanding and the Big Bang theory was started. I do not know what happened, one of only 12 people in the world who knew general relativity, he said that Big Bang is derive from equations of general relativity and conclude that Universe can be expand or contract (He may be Alexander Freemann -- information from NOVA on line). Even Einstein himself had a big surprise that his general relativity had that kind of conclusion. I don‘t think Fred Hoyle or Steve Hawkins mentioned anything about general relativity, but Einstein still get whole credit.

In recent years, some people believe that Universe is static there is a cosmological constant. . So people say, “you see” Einstein was right from the beginning. They still give the credit to Einstein. I don‘t know if those people who give credit to Einstein realize that if the Universe is static, the conclusion of general relativity by Alexander Freemann is wrong. So general relativity may be wrong. Nobody mentions it they just ignore it. So general relativity is still the greatest theory in the world.

Alexander Freemann derived his conclusion from equations of GR that the Universe can expand or contract are very ambiguous. Because if somebody concluded from a set mathematical equations, the conclusion must be either expand or contract not both. Otherwise there is a parameter to determine expansion or contraction. Can not be both without any constrain.

Equations of general relativity are the key point of this conclusion. So I found the equations in web site. The equations of GR are in Ricci tensor form. This tensor form is based on elliptic geometry. Einstein assumes Universe was elliptic geometry only because when he found a serious error in his reserch, he remembered that he had studied Gaussian theory in school, which is a theory of Riemannian geometry (Elliptic geometry). So he consulted his friend Grossman who was able to tell Einstein about important developments of Riemann, Ricci and Levi-Civita. In 1913 Einstein and Grossman joint published the equations of GR in metric tensor form, but still the theory was not right. In fact every year he corrected and submitted a new version of equations of GR. Even Einstein himself says, “That follow Einstein suits his convenience. Every year he retracts what he wrote the year before.”

November 1915, Einstein and Hilbert worked together to get the so-called final form of “gravitational field equations”. It was so complicated that nobody understands to be able to challenge if the equations are right or wrong. So that is the so-called final version of the equations stick. In my opinion, nobody challenging the correction of the equations does not mean it is right. Einstein had changed it so many times, how could he guarantee that it is really the correct version. If person really understands what he doing, he should not make corrections so many times.

Besides, there are two kinds of Non-Euclidean geometry, Hyperbolic and Elliptic.
In Elliptic space, every light ray is a geodesic line. Light rays will be circling the geodesic line forever unless blocked by some object. We can see the same light ray of star many times over, because the light

ray circles in the space forever. Also, we can see the same star from opposite directions many times too. The Universe was at least many billions old. All the lights of the sun and stars had collected so many billions of years. The Universe should be so bright even at nighttime. Of course that is not the case. So the possibility of the Universe is ether Euclidean or Hyperbolic Universe, if the Universe is not an Elliptic space. We don't care if Einstein's equations are right or wrong, it simply not suitable to applied. All the GR go out of the door.

Hundreds of years before Einstein, many people believed the Universe is Non-Euclidean space. Non-Euclidean space means there is a space constant. Space constant means cosmological constant. They are same things with difference names. When cosmological constant was proved (or believed to be proved), how come the credit went to Einstein but not the many people who believed the Universe is Non-Euclidean before Einstein.

Einstein covers both "yes" and "no". He definitely gets credit either way. It is not fair.
Both "yes" and "no" are contradiction each other. How could they both developed from the same general relativity? Is it possible people just try to use Einstein's name to prove they are right?

I tried to find out what general relativity is. I found a very good article written by Alan Lightman. In the article, he says "Einstein publish in 1915, general relativity proposed that gravity, as well as motion, can affect the intervals of time and of space. The key ideal of general relativity, called the equivalence of principle, is that gravity pulling in one direction is completely equivalence to an acceleration in the opposite direction." There is no equations, no transformations, no result but only a statement. How could this one statement conclude the Universe is static and also conclude the Universe is expanding even though they both contradict each other.

3. One of the most famous predictions of general relativity is bending of starlight by gravity in 1917 and proved in 1922 (Einstein still believed in the cosmological constant). When light was proved to be bending, people say general relativity is right. I don't see much connection with general relativity. If light is a particle with mass, and the sun has a massive mass. Obviously, light will be attracted by the sun's gravity. Even Newton's theory says so. How come this light bending is so great only because Einstein says so?

Besides, Einstein predicts the bending angle is 1.74 degree. But the actual measurement is off by a factor of 2. So Einstein said the one half is banded by Newton's gravity. And other half is caused by general relativity's space curvature. There are two reasons this 1.74 degree angle has problems.

(A). In 1922, when light bending was proved, Einstein still believed in the cosmological constant. So, he uses space curvature to explain the other half of light bending. After 1930, Einstein dropped the concept of cosmological constant, so to use space curvature to explained the other half of light bending after 1930 is not consistent. Before 1922, Einstein uses some theory to explain the other half of light bending. After he dropped that theory in 1930, keeping the same explanation is wrong, because the base of that theory does not exist any more.

(B). From Einstein's general relativity, the closer to the sun, the curvature bends more. That means every point has different

curvature. That means there are infinite different space curvatures in one space. There is no such space. One space can only have one space curvature. Besides, in uniform Non-Euclidean space, curvature does not bend any direction. They don‘t bend toward the sun or away from the sun. Straight line in Non-Euclidean space, observed by Euclidean space, looks like a bending curve. They simply do not bend. That means there is no such thing as space curvature cause the straight line bends 1.74 degree to any direction. If they really bend to any special direction, they cannot be called space curvature.

I think Einstein did it again. He simply bent the facts to suits his convenience.

4. When Dewey B. Larson wrote an article to prove Einstein was wrong, and Mr. Robert E. McElwaine post in remarq.com called “Lasonian Relativity, Einstein was wring!” to be discussed, people don’t even bother to read the article. People say “You do not try to ridicule me with silly joke”, “ on Nards! Lutefisk! Durian fruit!“ I don’t know about you, but only scientific source I believed are the ones which have a lot of the nouns in capital letters” “ Perhaps god is a cow guiding us with gamma rays”. When people proved Einstein was right, we don’t see any detail or equations, but the whole world believes it. When people proved Einstein is wrong, they write down so much detail that people don‘t even want to look at it. I wonder if Einstein is god?

Equations of general relativity in tensor form are so complicated that nobody understands. I don‘t think even Einstein understood his own equations. If he really understood, he wouldn’t need other scientist‘s help to correct them so many times. If he really understood, he wouldn’t need to be surprised when Alexander Freemann used his equations of general relativity to prove the universe can be expand or contract. Instead of believing in cosmological constant and embarrassing himself, he should have proved it by his own.(He says “that is my blunder time in my life”) Don‘t you think if anyone really understood something, they should be able to easily derived the conclusion. In recent years, some people may have proved the Big Bang theory is wrong. If the Big Bang theory is really wrong, then Alexander Freemann is wrong and general relativity is wrong.

Since Einstein published his theory of relativity, almost one century has passed. From my understanding, less than 12 people in the world really understand general relativity. It also difficult to identify those 12 people. I don‘t know they really exist or not. Even one of the famous scientist (I don’t remember his name) being identified as the third people in the world who understands general relativity, he simply deny it and say, “I am still looking for the third person”.

People like Relativity because they can exercise their unlimited and spectacular imaginations. All they need to say is relativity, curve time space, four dimensions, near light speed or Einstein’s gravity. After Einstein publish his final version of equations of general relativity. He did not do too much work on relativity. Most creation of fantasy world are the result of public imagination, more like science fictions. So many kind of versions just like Allice’s wonder land.

And just recenly, NEC research group public there experiment of breaking the speed of light. That put special relativity in questions too.

Even after almost one century, still only less than 12 people really

understand general relativity. There must be something wrong. It makes me think about the similarity to the Emperor‘s new clothes. Maybe I am stupid. But the Emperor’s new cloths were first seen-through by a stupid kid. Smart people do not dare to say so.

If the special relativity is right. Lorentz is the father of special relativity, and general relativity like Emperor‘s new cloths. L don’t know how much left for Einstein.
Is Einstein fake?

In this hundred years, Einstein creates the science of Alice’s wonderland. It wastes so much time and talent let scientist live in fantasy world. Every thing again relativity will be repelled even they are right. What had been happen like this is the most tradigy in the scientific world.

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Albert Einstein
The Incorrigible Plagiarist
By Christopher Jon Bjerknes

The name "Einstein" evokes images of genius, but was Albert Einstein, in fact, a plagiarist, who copied the theories of Lorentz, Poincare, Gerber, and Hilbert?

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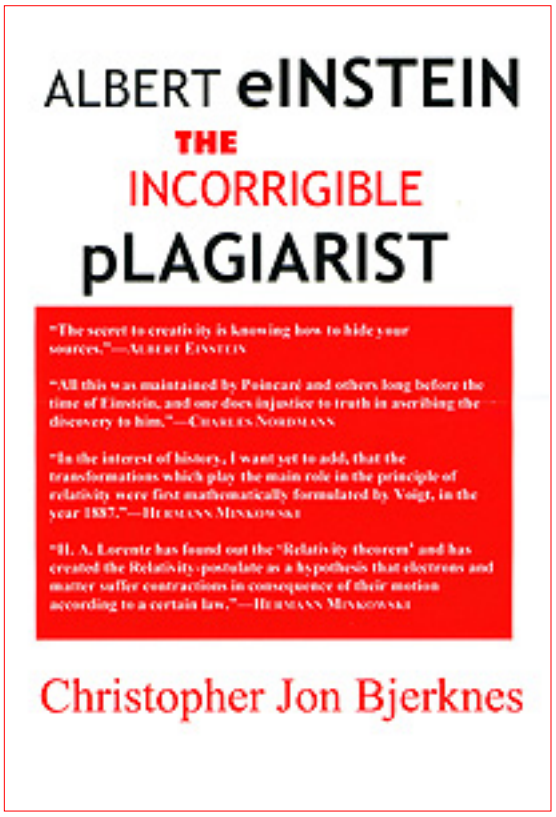

- The Priority Myth
- Space-Time, or is it "Time-Space"?
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- **Hero Worship**
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A scholarly documentation of Albert Einstein's plagiarism of the theory of relativity, "Albert Einstein: The Incorrigible Plagiarist" discloses Einstein's method for manipulating credit for the work of his contemporaries, reprints the prior works he parroted, and demonstrates through formal logical argument that Albert Einstein could not have drawn the conclusions he drew without prior knowledge of the works he copied, but failed to reference. Numerous republished quotations from Einstein's contemporaries prove that they were aware of his plagiarism.

"The appearance of Dr. Silberstein's recent article on 'General Relativity without the Equivalence Hypothesis' encourages me to restate my own views on the subject. I am perhaps entitled to do this as my work on the subject of General Relativity was published before that of Einstein and Kottler, and appears to have been overlooked by recent writers." **-- Harry Bateman**

"All this was maintained by Poincare and others long before the time of Einstein, and one does injustice to truth in ascribing the discovery to him." **-- Charles Nordmann**

"[Einstein's] paper 'Zur Elektrodynamik bewegter Koerper' in **Annalen der Physik*. . . contains not a single reference to previous literature. It gives you the impression of quite a new venture. But that is, of course, as I have tried to explain, not true."*** **-- Max Born**

"In point of fact, therefore, Poincare was not only the first to enunciate the principle, but he also discovered in Lorentz's work the necessary mathematical formulation of the principle. All this happened before Einstein's paper appeared." **-- G. H. Keswani**

"Einstein's explanation is a dimensional disguise for Lorentz's. . . . Thus Einstein's theory is not a denial of, nor an alternative

for, that of Lorentz. It is only a duplicate and disguise for it. . . . Einstein continually maintains that the theory of Lorentz is right, only he disagrees with his 'interpretation.' Is it not clear, therefore, that in this, as in other cases, Einstein's theory is merely a disguise for Lorentz's, the apparent disagreement about 'interpretation' being a matter of words only?" **-- James Mackaye**

"The secret to creativity is knowing how to hide your sources." **-- Albert Einstein**

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REVIEWS AND A RESPONSE:

Prof. Umberto Bartocci, *Episteme*, Volume 6, Number 2, (December 2002), pp. 281-286.

Dr. Thomas E. Phipps, Jr., *Infinite Energy Magazine*, Volume 8, Number 47, (January/February 2003), pp. 38-39.

Dr. John Stachel, *Physics World*, (April 2003).

A Response to John Stachel's Personal Attack

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RECENT ARTICLES BY CHRISTOPHER JON BJERKNES:

A synopsis of the book, which appeared in *The Canberra Times*

Einstein's Irrational Ontology of Redundancy
The Special Theory of Relativity and Its Many Fallacies of *Petitio Principii*

In *EPISTEME*

A Short History of the Concept of Relative Simultaneity
in the Special Theory of Relativity
In *EPISTEME*

THE SPEED OF GRAVITY

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Albert Einstein

Genius or Plagiarist

ALBERT EINSTEIN is held up as "a rare genius," who drastically changed the field of theoretical physics. However, using the technique known as 'The Often-Repeated Lie= Truth,' he has been made an idol to young people, and his very name has become synonymous with genius. THE TRUTH, HOWEVER, IS VERY DIFFERENT. Einstein was an inept & moronic person, who could not even tie his own shoelaces; he contributed NOTHING ORIGINAL to the field of quantum mechanics, nor any other science. On the contrary -- he stole the ideas of others, and the Jxxxx-controlled media made him a 'hero.'

When we actually examine the life of Albert Einstein, we find that his only 'brilliance' was in his ability to PLAGIARIZE and STEAL OTHER PEOPLE'S IDEAS, PASSING THEM OFF AS HIS OWN. Einstein's education, or lack thereof, is an important part of this story. The Encyclopedia Britannica says of Einstein's early education that he "showed little scholastic ability." It also says that at the age of 15, "with poor grades in history, geography, and languages, he left school with no diploma." Einstein himself wrote in a school paper of his "lack of imagination and practical ability." In 1895, Einstein failed a simple entrance exam to an engineering school in Zurich.

This exam consisted mainly of mathematical problems, and Einstein showed himself to be mathematically inept in this exam. He then entered a lesser school hoping to use it as a stepping stone to the engineering school he could not get into, but after graduating in 1900, he still could not get a position at the engineering school!

Unable to go to the school as he had wanted, he got a job (with the help of a friend) at the patent office in Bern. He was to be a technical expert third class, which meant that he was too incompetent for a higher qualified position. Even after publishing his so-called ground-breaking papers of 1905 and after working in the patent office for six years, he was only elevated to a second class standing. Remember, the work he was doing at the patent office, for which he was only rated third class, was not quantum mechanics or theoretical physics, but was reviewing technical documents for patents of every day things; yet he was barely qualified.

He would work at the patent office until 1909, all the while continuously trying to get a position at a university, but without success. All of these facts are true, but now begins the myth.

Supposedly, while working a full time job, without the aid of university colleagues, a staff of graduate students, a laboratory, or any of the things normally associated with an academic setting, Einstein in his spare

time wrote four ground-breaking essays in the field of theoretical physics and quantum mechanics that were published in 1905.

Many people have recognized the impossibility of such a feat, including Einstein himself, and therefore Einstein has led people to believe that many of these ideas came to him in his sleep, out of the blue, because indeed that is the only logical explanation of how an admittedly inept moron could have written such documents at the age of 26 without any real education.

HOWEVER, THE TRUTH IS: HE STOLE THE IDEAS AND PLAGIARIZED THE PAPERS.

Therefore, we will look at each of these ideas and discover the source of each. It should be remembered that these ideas are presented by Einstein's worshipers as totally new and completely different, each of which would change the landscape of science. These four papers dealt with the following four ideas, respectively:

1) The foundation of the photon theory of light;

2) The equivalence of energy and mass;

3) The explanation of Brownian motion in liquids;

4) The special theory of relativity.

Let us first look at the last of these theories, the theory of relativity. This is perhaps the most famous idea falsely attributed to Einstein. Specifically, this 1905 paper dealt with what Einstein called the Special Theory of Relativity (the General Theory would come in 1915).

This theory contradicted the traditional Newtonian mechanics and was based upon two premises:

1) in the absence of acceleration, the laws of nature are the same for all observers; and

2) since the speed of light is independent of the motion of its source, then the time interval between two events is longer for an observer in whose frame of reference the events occur at different places than for an observer in whose frame of reference the events occur in the same place. This is basically the idea that time passes more slowly as one's velocity approaches the speed of light, relative to slower velocities where time would pass faster. This theory has been validated by modern experiments and is the basis for modern physics. But these two premises are far from being originally Einstein's. FIRST OF ALL, THE IDEA THAT THE SPEED OF LIGHT WAS A CONSTANT AND WAS INDEPENDENT OF THE MOTION OF ITS SOURCE WAS NOT EINSTEIN'S AT ALL, BUT WAS PROPOSED BY THE SCOTTISH SCIENTIST JAMES MAXWELL in 1878.

Maxwell studied the phenomenon of light extensively and first proposed that it was electromagnetic in nature.

James Maxwell wrote an article to this effect for the 1878 edition of the Encyclopedia Britannica. His ideas prompted much debate, and by 1887, as a result of his work and the ensuing debate, the scientific community, particularly Lorentz, Michelson, and Morley reached the conclusion that the velocity of light was independent of the velocity of the observer.

Thus, this piece of the Special Theory of Relativity was known 27 years before Einstein wrote his paper. This debate over the nature of light also led Michelson and Morley to conduct an important experiment, the results of which could not be explained by Newtonian mechanics. They observed a phenomenon caused by relativity but they did not understand relativity. They had attempted to detect the motion of the earth through ether, which was a medium thought to be necessary for the propagation of light.

In response to this problem, in 1880, the irish physicist george fitz gerald, who had also first proposed a mechanism for producing radio waves, wrote a paper which stated that the results of the michelson-morley experiment could be explained if, "...the length of material bodies changes, according as they are moving through the either or across it by an amount depending on the square of the ratio of their velocities to that of

light."

THIS IS THE THEORY OF RELATIVITY, 13 YEARS BEFORE EINSTEIN'S PAPER!

FURTHER... IN 1892, HENDRIK LORENTZ, of the Netherlands, proposed the same solution and began to greatly expand the idea. All throughout the 1890's, both Lorentz and FitzGerald worked on these ideas and wrote articles strangely similar to Einstein's Special Theory detailing what is now known as the Lorentz-Fitz Gerald Contraction.

In 1898, the Irishman Joseph Larmor wrote down equations explaining the Lorentz-Fitzgerald contraction and its relativistic consequences, 7 years before Einstein's paper. By 1904, "Lorentz transformations," the series of equations explaining relativity, were published by Lorentz. They> describe the increase of mass, the shortening of length, and the time dilation of a body moving at speeds close to the velocity of light. In short, by 1904, everything in "Einstein's paper" regarding the Special Theory of Relativity had already been published. The Frenchman Poincaré had, in 1898, written a paper unifying many of these ideas. He stated seven years before Einstein's paper: "...we have no direct intuition about the equality of two time intervals. The simultaneity of two events or the order of their succession, as well as the equality of two time intervals, must be defined in such a way that the statements of the natural laws be as simple as possible." Anyone who has read Einstein's 1905 paper will immediately recognize the similarity and the lack of originality on the part of Einstein.

Thus, we see that the only thing original about the paper was the term 'Special Theory of Relativity.' EVERYTHING ELSE WAS PLAGIARIZED. Over the next few years, Poincaré became one of the most important lecturers and writers regarding relativity, but he never, in any of his papers or speeches, mentioned Albert Einstein. Thus, while Poincaré was busy bringing the rest of the academic world up to speed regarding relativity, Einstein was still working in the patent> office in Bern and no one in the academic community thought it necessary to give much credence or mention to Einstein's work. Most of these early physicists knew that he was a fraud.

This brings us to the explanation of Brownian motion, the subject of another of Einstein's 1905 papers. Brownian motion describes the irregular motion of a body arising from the thermal energy of the molecules of the material in which the body is immersed. The movement had first been observed by the Scottish botanist Robert Brown in 1827. The explanation of this phenomenon has to do with the Kinetic Theory of Matter, and it was the American Josiah Gibbs and the Austrian Ludwig Boltzmann who first explained this occurrence, not Albert Einstein. In fact, the mathematical equation describing the motion contains the famous Boltzmann constant, k. Between these two men, they had explained by the 1890s everything in Einstein's 1905 paper regarding Brownian motion.

The subject of the equivalence of mass and energy was contained in a third paper published by Einstein in 1905. This concept is expressed by the famous equation E=mc2. Einstein's biographers categorize this as "his most famous and most spectacular conclusion." Even though this idea is an obvious conclusion of Einstein's earlier relativity paper, it was not included in that paper but was published as an afterthought later in the year. Still, the idea of energy-mass equivalence was not original with Einstein.

That there was an equivalence between mass and energy had been shown in the laboratory in the 1890s by both J.J. Thomsom of Cambridge and by W. Kaufmann in Göttingen. In 1900, Poincaré had shown that there was a mass relationship for all forms of energy, not just electromagnetic energy. Yet, the most probable source of Einstein's plagiarism was Friedrich Hasenöhrl, one of the most brilliant, yet unappreciated physicists of the era. Hasenöhrl was the teacher of many of the German scientists who would later become famous for a variety of topics. He had worked on the idea of the equivalence of mass and energy for many years and had published a paper on the topic in 1904 in the very same journal which Einstein would publish his plagiarized version in 1905. For his brilliant work in this area, Hasenörhl had received in 1904 a prize from the prestigious Vienna Academy of Sciences.

Furthermore, the mathematical relationship of mass and energy was a simple deduction from the already well-known equations of Scottish physicist James Maxwell. Scientists long understood that the mathematical relationship expressed by the equation E=mc2 was the logical result of Maxwell's work, they just did not

believe it.

THUS, THE EXPERIMENTS OF THOMSON, KAUFMANN, AND FINALLY, AND MOST IMPORTANTLY, HASENÖRHL, CONFIRMED MAXWELL'S WORK. IT IS LUDICROUS TO BELIEVE THAT EINSTEIN DEVELOPED THIS POSTULATE, particularly in light of the fact that Einstein did not have the laboratory necessary to conduct the appropriate experiments. In this same plagiarized article of Einstein's, he suggested to the scientific community, "Perhaps it will prove possible to test this theory using bodies whose energy content is variable to a high degree (e.g., salts of radium)." This remark demonstrates how little Einstein understood about science, for this was truly an outlandish remark. By saying this, Einstein showed that he really did not understand basic scientific principles and that he was writing about a topic that he did not understand. In fact, in response to this article, J. Precht remarked that such an experiment "lies beyond the realm of possible experience." The last subject dealt with in Einstein's 1905 papers was the foundation of the photon theory of light. Einstein wrote about the photoelectric effect. The photoelectric effect is the release of electrons from certain metals or semiconductors by the action of light. This area of research is particularly important to the Einstein myth because it was for this topic that he UNJUSTLY received his 1922 Nobel Prize.

But AGAIN **IT IS NOT EINSTEIN, BUT WILHELM WIEN AND MAX PLANCK WHO DESERVE THE CREDIT**. The main point of Einstein's paper, and the point for which he is given credit, is that light is emitted and absorbed in finite packets called quanta. This was the explanation for the photoelectric effect. The photoelectric effect had been explained by Heinrich Hertz in 1888. Hertz and others, including Philipp Lenard, worked on understanding this phenomenon.

Lenard was the first to show that the energy of the electrons released in the photoelectric effect was not governed by the intensity of the light but by the frequency of the light. This was an important breakthrough. Wien and Planck were colleagues and they were the fathers of modern day quantum theory. By 1900, Max Planck, based upon his and Wien's work, had shown that radiated energy was absorbed and emitted in finite units called quanta. The only difference in his work of 1900 and Einstein's work of 1905 was that Einstein limited himself to talking about one particular type of energy light energy. But the principles and equations governing the process in general had been deduced by Planck in 1900. Einstein himself admitted that the obvious conclusion of Planck's work was that light also existed in discrete packets of energy. Thus, nothing in this paper of Einstein's was original.

After the 1905 papers of Einstein were published, the scientific community took little notice and Einstein continued his job at the patent office until 1909 when it was arranged by World Jewry for him to take a position at a school . Still, it was not until a 1919 A Jewish newspaper headline that he gained any notoriety. With Einstein's academic appointment in 1909, he was placed in a position where he could begin to use other people's work as his own more openly.

He engaged many of his students to look for ways to prove the theories he had supposedly developed, or ways to apply those theories, and then he could present the research as his own or at least take partial credit. In this vein, in 1912, he began to try and express his gravitational research in terms of a new, recently developed calculus, which was conducive to understanding relativity. This was the beginning of his General Theory of Relativity, which he would publish in 1915.

BUT THE MATHEMATICAL WORK WAS NOT DONE BY EINSTEIN - HE WAS INCAPABLE OF IT. Instead, it was performed by the mathematician Marcel Grossmann, who in turn used the mathematical principles developed by Berhard Riemann, who was the first to develop a sound non-Euclidean geometry, which is the basis of all mathematics used to describe relativity.

The General Theory of Relativity applied the principles of relativity to the universe; that is, to the gravitational pull of planets and their orbits, and the general principle that light rays bend as they pass by a massive object. Einstein published an initial paper in 1913 based upon the work which Grossmann did, adapting the math of Riemann to Relativity. But this paper was filled with errors and the conclusions were incorrect.

It appears that Grossmann was not smart enough to figure it out for Einstein. So Einstein was forced to look

elsewhere to plagiarize his General Theory. Einstein published his correct General Theory of Relativity in 1915, and said prior to its publication that he, "completely succeeded in convincing Hilbert and Klein." He is referring to David Hilbert, perhaps the most brilliantmathematician of the 20th century, and Felix Klein, another mathematician who had been instrumental in the development of the area of calculus that Grossmann had used to develop the General Theory of Relativity for Einstein.

Einstein's statement regarding the two men would lead the reader to believe that Einstein had changed Hilbert's and Klein's opinions regarding General Relativity, and that he had influenced them in their thinking.

However, the exact opposite is true. EINSTEIN STOLE THE MAJORITY OF HIS GENERAL RELATIVITY WORK FROM THESE TWO MEN, THE REST BEING TAKEN FROM GROSSMANN. HILBERT SUBMITTED FOR PUBLICATION, A WEEK BEFORE EINSTEIN COMPLETED HIS WORK, A PAPER WHICH CONTAINED THE CORRECT FIELD EQUATIONS, OF GENERAL RELATIVITY.

What this means is that Hilbert wrote basically the exact same paper, with the same conclusions, before Einstein did. Einstein would have had an opportunity to know of Hilbert's work all along, because there were friends of his working for Hilbert. Yet, even this was not necessary, for Einstein had seen Hilbert's paper in advance of publishing his own. Both of these papers were, before being printed, delivered in the form of a lecture.

Einstein presented his paper on November 25, 1915 in Berlin and Hilbert had presented his paper on November 20 in Göttingen. On November 18, Hilbert received a letter from Einstein thanking him for sending him a draft of the treatise Hilbert was to deliver on the 20th. So, in fact, Hilbert had sent a copy of his work at least two weeks in advance to Einstein before either of the two men delivered their lectures, but Einstein did not send Hilbert an advance copy of his.

Therefore, **THIS SERVES AS INCONTROVERTIBLE PROOF THAT EINSTEIN QUICKLY PLAGIARIZED THE WORK AND THEN PRESENTED IT, HOPING TO BEAT HILBERT TO THE PUNCH**. Also, at the same time, Einstein publicly began to belittle Hilbert, even though in the previous summer he had praised him in an effort to get Hilbert to share his work with him. Hilbert made the mistake of sending Einstein this draft copy, but still he delivered his work first. Not only did Hilbert publish his work first, but it was of much higher quality than Einstein's. It is known today that there are many problems with assumptions made in Einstein's General Theory paper. We know today that Hilbert was much closer to the truth. Hilbert's paper is the forerunner of the unified field theory of gravitation and electromagnetism and of the work of Erwin Schrödinger, whose work is the basis of all modern day quantum mechanics. That the group of men discussed so far were the actual originators of the ideas claimed by Einstein was known by the scientific community all along. In 1940, a group of German physicists meeting in Austria declared that "before Einstein, Aryan scientists like Lorentz, Hasenöhrl, Poincaré, etc., had created the foundations of the theory of relativity." However, the Jewish media did not promote the work of these men. The Jewish media did not promote the work of David Hilbert, but instead they promoted the work of the Jew Albert Einstein.

As we mentioned earlier, this General Theory, as postulated by Hilbert first and in plagiarized form by Einstein second, stated that light rays should bend when they pass by a massive object. In 1919, during the eclipse of the Sun, light from distant stars passing close to the Sun was observed to bend according to the theory. This evidence supported the General Theory of Relativity, and the Jxxxx-controlled media immediately seized upon the opportunity to prop up Einstein as a hero, at the expense of the true genius, David Hilbert. On November 7th, 1919, the London Times ran an article, the headline of which proclaimed, "Revolution in science - New theory of the Universe - Newtonian ideas overthrown." This was the beginning of the force-feeding of the Einstein myth to the masses. In the following years, Einstein's earlier 1905 papers were propagandized and Einstein was heralded as the originator of all the ideas he had stolen. Because of this push by the Jewish media, **in 1922, EINSTEIN RECEIVED THE NOBEL PRIZE FOR THE WORK HE HAD STOLEN IN 1905 REGARDING THE PHOTOELECTRIC EFFECT.**

The establishment of the Einstein farce between 1919 and 1922 was an important coup for world Zionism and Jewry. As soon as Einstein had been established as an idol to the popular masses of England and America, his image was promoted as the rare genius that he is erroneously believed to be today.

As such, he immediately began his work as a tool for World Zionism. The masses bought into the idea that if someone was so brilliant as to change our fundamental understanding of the universe, then certainly we ought to listen to his opinions regarding political and social issues.

This is exactly what World Jewry wanted to establish in its ongoing effort of social engineering. They certainly did not want someone like David Hilbert to be recognized as rare genius. After all, this physicist had come from a strong German, Christian background. His grandfather's two middle names were 'Fürchtegott Leberecht' or 'Fear God, Live Right.' In August of 1934, the day before a vote was to be taken regarding installing Adolf Hitler as President of the Reich, Hilbert signed a proclamation in support of Adolf Hitler, along with other leading German scientists, that was published in the German newspapers. So the Jews certainly did not want David Hilbert receiving the credit he deserved. The Jews did not want Max Planck receiving the credit he deserved either. This German's grandfather and great-grandfather had been important German theologians, and during World War II he would stay in Germany throughout the war, supporting his fatherland the best he could. The Jews certainly did not want the up-and-coming Erwin Schrödinger to be heralded as a genius to the masses. This Austrian physicist would go on to teach at Adolf Hitler University in Austria, and he wrote a public letter expressing his support for the Third Reich. This Austrian's work on the unified field theory was a forerunner of modern physics, even though it had been criticized by Einstein, who apparently could not understand it.

The Jews did not want to have Werner Heisenberg promoted as a rare genius, even though he would go on to solidify quantum theory and contribute to it greatly, as well as develop his famous uncertainty principle, in addition to describing the modern atom and nucleus and the binding energies that are essential to modern chemistry.

NO, THE JEWS DID NOT WANT HEISENBERG PROMOTED AS A GENIUS BECAUSE HE WOULD GO ON TO HEAD THE GERMAN ATOMIC BOMB PROJECT AND SERVE PRISON TIME AFTER THE WAR FOR HIS INVOLVEMENT WITH THE THIRD REICH. No, the Jews did not want to give credit to any of a number of Germans, Austrians, Irishmen, Frenchmen, Scotsmen, Englishmen, and even Americans who had contributed to the body of knowledge and evidence from which Einstein plagiarized and stole his work. Instead, they needed to erect Einstein as their golden calf, even though he repeatedly and often embarrassed himself with his nonfactual or nearsighted comments regarding the work he had supposedly done. For example, in 1934, the Pittsburgh Post-Gazette ran a front page article in which Einstein gave an "emphatic denial" regarding the idea of practical applications for the "energy of the atom." The article says, "But the 'energy of the atom' is something else again. If you believe that man will someday be able to harness this boundless energyto drive a great steamship across the ocean on a pint of water, for instancethen, according to Einstein, you are wrong"

Again, Einstein clearly did not understand the branch of physics he had supposedly founded, though elsewhere in the world at the time theoretical research was underway that would lead to the atomic bomb and nuclear energy. But after Einstein was promoted as a god in 1919, he made no real attempts to plagiarize any other work. Rather, he began his real purpose evangelizing for the cause of Zionism and World Jewry. Though he did publish other articles after this time, all of them were co-authored by at least one other person, and in each instance, Einstein had little if anything to do with the research that led to the articles; he was merely recruited by the co-authors in order to lend credence to their work. Thus freed of the pretense of academia, Einstein began his assault for World Zionism.

Summary and Conclusions

Albert Einstein: Prophet or Plagiarist

Speculation: Tell the truth about Einstein and the cash cow dies (Einstein loses credibility). Engage in half truths about Einstein for decades, get Time Magazine to elevate Einstein to the status of Person of the Century and the supreme con works. All you have to do to make the con work is suppress unfavorable information about Einstein He was a plagiarist yet somehow this information never made it to the American public. How many of you ever heard that Einstein was a blatant, brazen plagiarist? Why havent you heard it? The physics community buried it. Then the physics community makes billions of dollars from grants, awards, power, prestige, stipends, money, travel, book deals, honoraria, etc over the next several decades. Advertising people would readily agree, that Person of the Century is worth billions of dollars to the physics community over the next 25 to 50 years. This is similar to artificially inflating a stock price with false stories and then cashing in at the lofty price. Substitute getting research grants approved instead of cashing in at a lofty price, and you have the physics community.

It should be obvious that there is absolutely no incentive for the physics community to tell the truth about Einstein except that they might get caught. They have a tremendous conflict of interest between telling the truth about Einstein or promoting physics. It appears that telling the truth about Einstein is not high on the list of priorities of the physics community. One of the ways that the physics community has legal problems is with respect to the phrase passive fraud. I define passive fraud as the willingness to leave on the record false information and then benefit from that false information. In other words, the physics community may not have to do anything proactive. All they have to do is permit false and misleading information to go unchallenged and then benefit from it.

The physics community may face the following charges: 1)Conspiracy, for failing to get out the truth about Einstein, 2)Fraud, for the placement (or covert support) of false information on the record and then benefitting from it, 3)Perjury, for false statements in research grants, 4)Racketeering, For acting like organized criminals. 5)Obstruction of justice as the scientists try to destroy documents. The justice department should squeeze undergraduates first, then graduates, then adjunct professors, then full professors, then Department Heads, then the chancellors of the universities, and then Nobel Laureates. The level of criminality that the physics community has engaged in is perhaps fourth or fifth behind organized crime as the leading class of criminals in our society in terms of total felonies committed and magnitude of the money involved.

One of the biggest problems facing the physics community is that they are incredibly arrogant and view themselves as being intellectually superior. Consider these passages from Gleicks book, CHAOS, Making a New Science: These scientists had experience with brilliance and with eccentricity. p. 2, I understand youre real smart, Agnew said to Feigenbaum, If youre so smart, why dont you just solve laser fusion? p.2, To a physicist, creating laser fusion was a legitimate problem; puzzling out the spin and color and flavor of small particles was a legitimate problem; dating the origin of the universe was a legitimate problem. Understanding clouds was a job for a meteorologist. Like other physicists, Feigenbaum used an understated, tough-guy vocabulary to rate such problems. p.3, The most passionate advocates of the new science go so far as to say that Twentieth century science will be remembered for just three things: relativity, quantum mechanics, and chaos. p.6

What the physics community is going to realize is that, painfully, their very intelligence is their greatest enemy; a Mafia underling with an IQ of 80, might not realize he was in the middle of a conspiracy. Is a brilliant physicist unaware of what it meant if Einstein was a plagiarist or that the physics community had falsified the data surrounding the eclipse of 1919 and 1922? Were they completely unaware that falsehoods with respect to Einstein would result in an increase in funding to the physics community? The physics community has two choices: They may argue that they are incredible ignoramuses and have no idea of illegal activities. The basic problem with this approach is that the phyics community has gone to great pains to tell us how brilliant they are. Now that they are caught conducting illegal activity, they have to play dumb. Somehow, a defense along the lines of: When Im a physicist, Im brilliant, but when Im a crook, Im stupid, has poor prospects of success. This is not a recommended defense for the physics community. So why are we funding stupid people? Or, they knew what was going on and deliberately covered it up. In which case, they are crooks. Why are we funding crooks?

Until reading the following page, Birdman Bryant appeared to be a fair and objective observer, writer and researcher!

However, his request "**above all to remove the anti-Jewish remarks which, whether true or not, are inappropriate in the present context**", coupled with his acceptance of the insult of the real scientists who did the real research which Einstein plagiarized as "**half-mad anti-Semitic ones during the Nazi years**", confirms the worst suspicions: Birdman is a birdbrain jew.

http://www.thebirdman.org/Index/Others/Others-EinsteinWasAFraud-Correspondence.html

Correspondence on "Einstein Was a Fraud"

To whom it may concern:

I have recently come upon an article which asserts in a credible way that Einstein plagiarized most of his work. Altho the article is not properly documented, the author obviously knows his subject. (I have communicated with the author and requested documentation, but he has not yet provided it, and I am uncertain of his willingness to do so.) Another unfortunate feature of the article is its obvious bias against Jews -- a bias which might or might not be justified, but which is clearly inappropriate here.

If the assertions in this article are true, it is obviously of vital importance for the history of science, as it would change Einstein's status from a 20th century scientific icon to a probably-incompetent plagairist. Therefore, I request that you, as someone with both interest and knowledge of the history of Relativity Theory, give me an informed judgment on the correctness of this article. I have posted it on my webpage at

http://www.thebirdman.org/Index/Others/Others-EinsteinWasAFraud.htm

Thank you for your interest. -John Bryant

Thanks for your inquiry to the Niels Bohr Library. I have looked at the article in question. It is completely without value. Of course it is true that Einstein built on the work of his predecessors, and in his work, as in the work of all scientists, one can easily trace ideas that were already present in one or another form. Even the greatest scientific work consists largely of combining, rethinking and clarifying concepts that are in the air. Einstein actually went considerably beyond this. The paper has too many errors to be worth detailed analysis. Let me just mention the first extremely ignorant error in it. This is the statement that Maxwell already showed the constancy of the speed of light. Einstein's great contribution (well, one of his many great contributions) was the fantastic hypothesis that the speed of light is constant in all reference frames--something Maxwell literally could not conceive, something that all other physicists of his time and down to Einstein's found almost unthinkable, and yet something which every experiment has shown to be completely true.

If you don't know what I mean by constant in all reference frames--(something the author of the paper clearly does not know)--then you should not be worrying about any of this until you have read one of the many good books explaining, with simple high-school algebra, what Einstein discovered.

To sum up, there is very good reason why all serious physicists (aside from some half-mad anti-Semitic ones during the Nazi years) have admired and praised Einstein for his work. You are not doing anybody a service by putting on your site a copy of this anti-Semitic screed, which is not even original but only one more version of old nonense, propagated by Nazis in the 1930s and long since refuted.

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To: Pastor VS Herrell From: John Bryant Re: Einstein article CC: various

Yesterday I sent an email message to about 10 experts in the history of science and/or relativity theory asking them to read the article Einstein Was a Fraud. I have received just 2 responses, both negative, tho one respondee seemed not to have read the article. The other response is given below. I am going to publish it along with the article, and I welcome your response, if you care to make one (If you do not, I will note the fact). I now have less confidence that the article is correct, so I urge you to put your article in proper scholarly form, to seek properly qualified individuals who will support you (or correct your errors), and above all to remove the anti-Jewish remarks which, whether true or not, are inappropriate in the present context. -jb

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Willie Martin on Albert Einstein

Albert Einstein arrives in America and accepts a position at Abraham Flexner's Institute for Advanced Studies at Princeton. WHERE ALBERT EINSTEIN IS HELD UP BY THE JEWISH LIARS AS A RARE GENIUS WHO DRASTICALLY CHANGED THE FIELD OF THEORETICAL PHYSICS. As such, he is made an idol to young people and his very name has become synonymous with genius. THE TRUTH, HOWEVER, IS VERY DIFFERENT. THE REALITY IS THAT EINSTEIN WAS AN INEPT, MORONIC JEW WHO COULD NOT EVEN TIE HIS OWN SHOELACES; HE CONTRIBUTED NOTHING ORIGINAL TO THE FIELD OF QUANTUM MECHANICS OR ANY OTHER SCIENCE, BUT ON THE CONTRARY HE STOLE THE IDEAS OF OTHER MEN AND THE JEWISH MEDIA MADE HIM A HERO.

When we actually examine the life of Albert Einstein, WE FIND THAT HIS ONLY BRILLIANCE LIES IN HIS ABILITY TO PLAGIARIZE AND STEAL OTHER PEOPLE=S IDEAS, PASSING THEM OFF AS HIS OWN (A typical Jewish expertise). Einstein's education, or lack thereof, is an important part of this story.

The Encyclopedia Britannica says of Einstein's early education that he >showed little scholastic ability.= It also says that at the age of 15, >with poor grades in history, geography, and languages, he left school with no diploma.= Einstein himself wrote in a school paper of his >lack of imagination and practical ability.= In 1895, Einstein failed a simple entrance exam to an engineering school in Zurich.

This exam consisted mainly of mathematical problems, and Einstein showed himself to be mathematically inept in this exam. He then entered a lesser school hoping to use it as a stepping stone to the engineering school he could not get into, but after graduating in 1900, he still could not get a position at the engineering school!

Unable to go to the school as he had wanted, he got a job (with the help of a friend) at the patent office in Bern. He was to be a technical expert third class, which meant that he was too incompetent for a higher qualified position. Even after publishing his so-called ground-breaking papers of 1905 and after working in the patent office for six years, he was only elevated to a second class standing. Remember, the work he was doing at the patent office, for which he was only rated third class, was not quantum mechanics or theoretical physics, but was reviewing technical documents for patents of every day things; yet he was barely qualified.

He would work at the patent office until 1909, all the while continuously trying to get a position at a university, but without success. All of these facts are true, but now begins the Jewish myth.

Supposedly, while working a full time job, without the aid of university colleagues, a staff of graduate students, a laboratory, or any of the things normally associated with an academic setting, Einstein in his spare time wrote four ground-breaking essays in the field of theoretical physics and quantum mechanics that were published in 1905.

Many people have recognized the impossibility of such a feat, including Einstein himself, and therefore Einstein has led people to believe that many of these ideas came to him in his sleep, out of the blue, because indeed that is the only logical explanation of how an admittedly inept moron could have written such documents at the age of 26 without any real education. HOWEVER, A SIMPLER EXPLANATION EXISTS: HE STOLE THE IDEAS AND PLAGIARIZED THE PAPERS.

Therefore, we will look at each of these ideas and discover the source of each. It should be remembered that these ideas are presented by Einstein's worshipers as totally new and completely different, each of which would change the landscape of science. These four papers dealt with the following four ideas, respectively:

1) The foundation of the photon theory of light;

2) The equivalence of energy and mass;

3) The explanation of Brownian motion in liquids;

4) The special theory of relativity.

Let us first look at the last of these theories, the theory of relativity. This is perhaps the most famous idea falsely attributed to Einstein. Specifically, this 1905 paper dealt with what Einstein called the Special Theory of Relativity (the General Theory would come in 1915). This theory contradicted the traditional Newtonian mechanics and was based upon two premises: 1) in the absence of acceleration, the laws of nature are the same for all observers; and 2) since the speed of light is independent of the motion of its source, then the time interval between two events is longer for an observer in whose frame of reference the events occur at different places than for an observer in whose frame of reference the events occur in the same place.

This is basically the idea that time passes more slowly as one's velocity approaches the speed of light, relative to slower velocities where time would pass faster.

This theory has been validated by modern experiments and is the basis for modern physics. But these two premises are far from being originally Einstein's. FIRST OF ALL, THE IDEA THAT THE SPEED OF LIGHT WAS A CONSTANT AND WAS INDEPENDENT OF THE MOTION OF ITS SOURCE WAS NOT EINSTEIN=S AT ALL, BUT WAS PROPOSED BY THE SCOTTISH SCIENTIST JAMES MAXWELL. Maxwell studied the phenomenon of light extensively and first proposed that it was electromagnetic in nature.

He wrote an article to this effect for the 1878 edition of the Encyclopedia Britannica. His ideas prompted much debate, and by 1887, as a result of his work and the ensuing debate, the scientific community, particularly Lorentz, Michelson, and Morley reached the conclusion that the velocity of light was independent of the velocity of the observer. Thus, this piece of the Special Theory of Relativity was known 27 years before Einstein wrote his paper.

This debate over the nature of light also led Michelson and Morley to conduct an important experiment, the results of which could not be explained by Newtonian mechanics. They observed a phenomenon caused by relativity but they did not understand relativity.

They had attempted to detect the motion of the earth through ether, which was a medium thought to be necessary for the propagation of light. IN RESPONSE TO THIS PROBLEM, IN 1880, THE IRISH PHYSICIST GEORGE FITZ GERALD, WHO HAD ALSO FIRST PROPOSED A MECHANISM FOR PRODUCING RADIO WAVES, WROTE A PAPER WHICH STATED THAT THE RESULTS OF THE MICHELSON-MORLEY EXPERIMENT COULD BE EXPLAINED IF, A...THE LENGTH OF MATERIAL BODIES CHANGES, ACCORDING AS THEY ARE MOVING THROUGH THE EITHER OR ACROSS IT BY AN AMOUNT DEPENDING ON THE SQUARE OF THE RATIO OF THEIR VELOCITIES TO THAT OF LIGHT.@

THIS IS THE THEORY OF RELATIVITY, 13 YEARS BEFORE EINSTEIN=S PAPER!

FURTHERMORE, IN 1892, HENDRIK LORENTZ, FROM THE NETHERLANDS, PROPOSED THE SAME SOLUTION AND BEGAN TO GREATLY EXPAND THE IDEA. All throughout the 1890's, both Lorentz and FitzGerald worked on these ideas and wrote articles strangely similar to Einstein's Special Theory detailing what is now known as the Lorentz-Fitz Gerald Contraction.

IN 1898, THE IRISHMAN JOSEPH LARMOR WROTE DOWN EQUATIONS EXPLAINING THE LORENTZ-FITZ GERALD CONTRACTION AND ITS RELATIVISTIC CONSEQUENCES, 7 YEARS

BEFORE EINSTEIN=S PAPER. By 1904, Lorentz transformations, the series of equations explaining relativity, were published by Lorentz. They describe the increase of mass, the shortening of length, and the time dilation of a body moving at speeds close to the velocity of light. In short, by 1904, everything in Einstein's paper regarding the Special Theory of Relativity had already been published.

The Frenchman Poincaré had, in 1898, written a paper unifying many of these ideas. HE STATED SEVEN YEARS BEFORE EINSTEIN=S PAPER THAT, A...we have no direct intuition about the equality of two time intervals. The simultaneity of two events or the order of their succession, as well as the equality of two time intervals, must be defined in such a way that the statements of the natural laws be as simple as possible.@

ANYONE WHO HAS READ EINSTEIN=S 1905 PAPER WILL IMMEDIATELY RECOGNIZE THE SIMILARITY AND THE LACK OF ORIGINALITY ON THE PART OF EINSTEIN.

Thus we see that the only thing original about the paper was the term 'Special Theory of Relativity.' EVERYTHING ELSE WAS PLAGIARIZED. Over the next few years, Poincaré became one of the most important lecturers and writers regarding relativity, but he never, in any of his papers or speeches, mentioned Albert Einstein.

Thus, while Poincaré was busy bringing the rest of the academic world up to speed regarding relativity, Einstein was still working in the patent office in Bern and no one in the academic community thought it necessary to give much credence or mention to Einstein's work. Most of these early physicists knew that he was a fraud.

This brings us to the explanation of Brownian motion, the subject of another of Einstein's 1905 papers. Brownian motion describes the irregular motion of a body arising from the thermal energy of the molecules of the material in which the body is immersed. The movement had first been observed by the Scottish botanist Robert Brown in 1827.

The explanation of this phenomenon has to do with the Kinetic Theory of Matter, and it was the American Josiah Gibbs and the Austrian Ludwig Boltzmann who first explained this occurrence, not Albert Einstein. In fact, the mathematical equation describing the motion contains the famous Boltzmann constant, k. Between these two men, they had explained by the 1890s everything in Einstein's 1905 paper regarding Brownian motion.

The subject of the equivalence of mass and energy was contained in a third paper published by Einstein in 1905. This concept is expressed by the famous equation E=mc2. Einstein's biographers categorize this as Ahis most famous and most spectacular conclusion.@ Even though this idea is an obvious conclusion of Einstein's earlier relativity paper, it was not included in that paper but was published as an afterthought later in the year. Still, the idea of energy-mass equivalence was not original with Einstein.

That there was an equivalence between mass and energy had been shown in the laboratory in the 1890s by both J.J. Thomsom of Cambridge and by W. Kaufmann in Göttingen. In 1900, Poincaré had shown that there was a mass relationship for all forms of energy, not just electromagnetic energy. Yet, the most probable source of Einstein's plagiarism was Friedrich Hasenöhrl, one of the most brilliant, yet unappreciated physicists of the era.

Hasenöhrl was the teacher of many of the German scientists who would later become famous for a variety of topics. He had worked on the idea of the equivalence of mass and energy for many years and had published a paper on the topic in 1904 in the very same journal which Einstein would publish his plagiarized version in 1905. For his brilliant work in this area, Hasenörhl had received in 1904 a prize from the prestigious Vienna Academy of Sciences.

Furthermore, the mathematical relationship of mass and energy was a simple deduction from the already well-known equations of Scottish physicist James Maxwell. Scientists long understood that the mathematical relationship expressed by the equation E=mc2 was the logical result of Maxwell's work, they just did not believe it.

THUS, THE EXPERIMENTS OF THOMSON, KAUFMANN, AND FINALLY, AND MOST IMPORTANTLY, HASENÖRHL, CONFIRMED MAXWELL=S WORK. IT IS LUDICROUS TO BELIEVE

THAT EINSTEIN DEVELOPED THIS POSTULATE, particularly in light of the fact that Einstein did not have the laboratory necessary to conduct the appropriate experiments.

In this same plagiarized article of Einstein's, he suggested to the scientific community, APerhaps it will prove possible to test this theory using bodies whose energy content is variable to a high degree (e.g., salts of radium).@

This remark demonstrates how little Einstein understood about science, for this was truly an outlandish remark. By saying this, Einstein showed that he really did not understand basic scientific principles and that he was writing about a topic that he did not understand. In fact, in response to this article, J. Precht remarked that such an experiment Alies beyond the realm of possible experience.@

The last subject dealt with in Einstein's 1905 papers was the foundation of the photon theory of light. Einstein wrote about the photoelectric effect. The photoelectric effect is the release of electrons from certain metals or semiconductors by the action of light. This area of research is particularly important to the Einstein myth because it was for this topic that he UNJUSTLY received his 1922 Nobel Prize.

But AGAIN IT IS NOT EINSTEIN, BUT WILHELM WIEN AND MAX PLANCK WHO DESERVE THE CREDIT. The main point of Einstein's paper, and the point for which he is given credit, is that light is emitted and absorbed in finite packets called quanta. This was the explanation for the photoelectric effect. The photoelectric effect had been explained by Heinrich Hertz in 1888. Hertz and others, including Philipp Lenard, worked on understanding this phenomenon.

Lenard was the first to show that the energy of the electrons released in the photoelectric effect was not governed by the intensity of the light but by the frequency of the light. This was an important breakthrough.

Wien and Planck were colleagues and they were the fathers of modern day quantum theory. By 1900, Max Planck, based upon his and Wien's work, had shown that radiated energy was absorbed and emitted in finite units called quanta. The only difference in his work of 1900 and Einstein's work of 1905 was that Einstein limited himself to talking about one particular type of energy n light energy. But the principles and equations governing the process in general had been deduced by Planck in 1900. Einstein himself admitted that the obvious conclusion of Planck's work was that light also existed in discrete packets of energy. Thus, nothing in this paper of Einstein's was original.

After the 1905 papers of Einstein were published, the scientific community took little notice and Einstein continued his job at the patent office until 1909 when it was arranged for him to take a position at a school by World Jewry.

Still, it was not until a 1919 (A Jewish) newspaper headline that he gained any notoriety. With Einstein's academic appointment in 1909, he was placed in a position where he could begin to use other people's work as his own more openly.

He engaged many of his students to look for ways to prove the theories he had supposedly developed, or ways to apply those theories, and then he could present the research as his own or at least take partial credit.

In this vein, in 1912, he began to try and express his gravitational research in terms of a new, recently developed calculus, which was conducive to understanding relativity. This was the beginning of his General Theory of Relativity, which he would publish in 1915. BUT THE MATHEMATICAL WORK WAS NOT DONE BY EINSTEIN; HE WAS INCAPABLE OF IT. Instead, it was performed by the mathematician Marcel Grossmann, who in turn used the mathematical principles developed by Berhard Riemann, who was the first to develop a sound non-Euclidean geometry, which is the basis of all mathematics used to describe relativity.

The General Theory of Relativity applied the principles of relativity to the universe; that is, to the gravitational pull of planets and their orbits, and the general principle that light rays bend as they pass by a massive object. Einstein published an initial paper in 1913 based upon the work which Grossmann did, adapting the math of Riemann to Relativity. But this paper was filled with errors and the conclusions were incorrect.

It appears that Grossmann was not smart enough to figure it out for Einstein. So Einstein was forced to look elsewhere to plagiarize his General Theory. Einstein published his correct General Theory of Relativity in 1915, and said prior to its publication that he, Acompletely succeeded in convincing Hilbert and Klein.@ He is referring to David Hilbert, perhaps the most brilliant mathematician of the 20th century, and Felix Klein, another mathematician who had been instrumental in the development of the area of calculus that Grossmann had used to develop the General Theory of Relativity for Einstein.

Einstein's statement regarding the two men would lead the reader to believe that Einstein had changed Hilbert's and Klein's opinions regarding General Relativity, and that he had influenced them in their thinking.

However, the exact opposite is true. EINSTEIN STOLE THE MAJORITY OF HIS GENERAL RELATIVITY WORK FROM THESE TWO MEN, THE REST BEING TAKEN FROM GROSSMANN. HILBERT SUBMITTED FOR PUBLICATION, A WEEK BEFORE EINSTEIN COMPLETED HIS WORK, A PAPER WHICH CONTAINED THE CORRECT FIELD EQUATIONS OF GENERAL RELATIVITY.

What this means is that Hilbert wrote basically the exact same paper, with the same conclusions, before Einstein did. Einstein would have had an opportunity to know of Hilbert's work all along, because there were Jewish friends of his working for Hilbert. Yet, even this was not necessary, for Einstein had seen Hilbert's paper in advance of publishing his own. Both of these papers were, before being printed, delivered in the form of a lecture.

Einstein presented his paper on November 25, 1915 in Berlin and Hilbert had presented his paper on November 20 in Göttingen. On November 18, Hilbert received a letter from Einstein thanking him for sending him a draft of the treatise Hilbert was to deliver on the 20th. So, in fact, Hilbert had sent a copy of his work at least two weeks in advance to Einstein before either of the two men delivered their lectures, but Einstein did not send Hilbert an advance copy of his.

Therefore, THIS SERVES AS INCONTROVERTIBLE PROOF THAT EINSTEIN QUICKLY PLAGIARIZED THE WORK AND THEN PRESENTED IT, HOPING TO BEAT HILBERT TO THE PUNCH. Also, at the same time, Einstein publicly began to belittle Hilbert, even though in the previous summer he had praised him in an effort to get Hilbert to share his work with him. Hilbert made the mistake of sending Einstein this draft copy, but still he delivered his work first.

Not only did Hilbert publish his work first, but it was of much higher quality than Einstein's. It is known today that there are many problems with assumptions made in Einstein's General Theory paper. We know today that Hilbert was much closer to the truth. Hilbert's paper is the forerunner of the unified field theory of gravitation and electromagnetism and of the work of Erwin Schrödinger, whose work is the basis of all modern day quantum mechanics.

That the group of men discussed so far were the actual originators of the ideas claimed by Einstein was known by the scientific community all along. In 1940, a group of German physicists meeting in Austria declared that Abefore Einstein, Aryan scientists like Lorentz, Hasenöhrl, Poincaré, etc., had created the foundations of the theory of relativity.@ However, the Jewish media did not promote the work of these men. The Jewish media did not promote the work of David Hilbert, but instead they promoted the work of the Jew Albert Einstein.

As we mentioned earlier, this General Theory, as postulated by Hilbert first and in plagiarized form by Einstein second, stated that light rays should bend when they pass by a massive object. In 1919, during the eclipse of the Sun, light from distant stars passing close to the Sun was observed to bend according to the theory. This evidence supported the General Theory of Relativity, and the Jewish-controlled media immediately seized upon the opportunity to prop up Einstein as a hero, at the expense of the true genius, David Hilbert.

On November 7th, 1919, the London Times ran an article, the headline of which proclaimed, ARevolution in science; New theory of the Universe, Newtonian ideas overthrown.@ This was the beginning of the force-feeding of the Einstein myth to the masses. In the following years, Einstein's earlier 1905 papers were propagandized and Einstein was heralded as the originator of all the ideas he had stolen. Because of this push by the Jewish media, in 1922, EINSTEIN RECEIVED THE NOBEL PRIZE FOR THE WORK HE HAD

STOLEN IN 1905 REGARDING THE PHOTOELECTRIC EFFECT.

The establishment of the Einstein farce between 1919 and 1922 was an important coup for world Zionism and Jewry. As soon as Einstein had been established as an idol to the popular masses of England and America, his image was promoted as the rare genius that he is erroneously believed to be today.

As such, he immediately began his work as a tool for World Zionism. The masses bought into the idea that if someone was so brilliant as to change our fundamental understanding of the universe, then certainly we ought to listen to his opinions regarding political and social issues.

This is exactly what World Jewry wanted to establish in its ongoing effort of social engineering. They certainly did not want someone like David Hilbert to be recognized as rare genius. After all, this physicist had come from a strong German, Christian background. His grandfather's two middle names were 'Fürchtegott Leberecht' or 'Fear God, Live Right.' In August of 1934, the day before a vote was to be taken regarding installing Adolf Hitler as President of the Reich, Hilbert signed a proclamation in support of Adolf Hitler, along with other leading German scientists, that was published in the German newspapers. So the Jews certainly did not want David Hilbert receiving the credit he deserved.

The Jews did not want Max Planck receiving the credit he deserved either. This German's grandfather and great-grandfather had been important German theologians, and during World War II he would stay in Germany throughout the war, supporting his fatherland the best he could.

The Jews certainly did not want the up-and-coming Erwin Schrödinger to be heralded as a genius to the masses. This Austrian physicist would go on to teach at Adolf Hitler University in Austria, and he wrote a public letter expressing his support for the Third Reich. This Austrian's work on the unified field theory was a forerunner of modern physics, even though it had been criticized by Einstein, who apparently could not understand it.

The Jews did not want to have Werner Heisenberg promoted as a rare genius, even though he would go on to solidify quantum theory and contribute to it greatly, as well as develop his famous uncertainty principle, in addition to describing the modern atom and nucleus and the binding energies that are essential to modern chemistry.

NO, THE JEWS DID NOT WANT HEISENBERG PROMOTED AS A GENIUS BECAUSE HE WOULD GO ON TO HEAD THE GERMAN ATOMIC BOMB PROJECT AND SERVE PRISON TIME AFTER THE WAR FOR HIS INVOLVEMENT WITH THE THIRD REICH.

No, the Jews did not want to give credit to any of a number of white Germans, Austrians, Irishmen, Frenchmen, Scotsmen, Englishmen, and even Americans who had contributed to the body of knowledge and evidence from which Einstein plagiarized and stole his work.

Instead, they needed to erect Einstein as their golden calf, even though he repeatedly and often embarrassed himself with his nonfactual or nearsighted comments regarding the work he had supposedly done. For example, in 1934, the Pittsburgh Post-Gazette ran a front page article in which Einstein gave an Aemphatic denial@ regarding the idea of practical applications for the Aenergy of the atom.@ The article says, ABut the 'energy of the atom' is something else again. If you believe that man will someday be able to harness this boundless energynto drive a great steamship across the ocean on a pint of water, for instancenthen, according to Einstein, you are wrong@

Again, Einstein clearly did not understand the branch of physics he had supposedly founded, though elsewhere in the world at the time theoretical research was underway that would lead to the atomic bomb and nuclear energy.

But after Einstein was promoted as a god in 1919, he made no real attempts to plagiarize any other work. Rather, he began his real purpose n evangelizing for the cause of Zionism and World Jewry. Though he did publish other articles after this time, all of them were co-authored by at least one other person, and in each instance, Einstein had little if anything to do with the research that led to the articles; he was merely recruited by the co-authors in order to lend credence to their work. Thus freed of the pretense of academia, Einstein

began his assault for World Zionism.

In 1921, Einstein made his first visit to the United States on a fund-raising tour for the Hebrew University in Jerusalem and to promote Zionism. In April of 1922, Einstein used his status to gain membership in a Commission of the League of Nations. In February of 1923, Einstein visits Tel Aviv and Jerusalem. In June of 1923, he becomes a founding member of the Association of Friends of the New Russia. In 1926, Einstein took a break from his Communist and Zionistic activities to again embarrass himself scientifically by criticizing the work of Schrödinger and Heisenberg. Following a brief illness, he resumes his Zionistic agenda, wanting an independent Israel and at the same time a World Government.

In the 1930s he actively campaigns against all forms of war, although he would reverse this position during World War II when he advocated war against Germany and the creation of the atomic bomb, which he thought was impossible to build. In 1939 and 1940, Einstein, at the request of other Jews, wrote two letters to Roosevelt urging an American program to develop an atomic bomb to be used on Germany n not Japan. Einstein would have no part in the actual construction of the bomb, theoretical or practical, because he lacked the skills for either.

In December of 1946, Einstein rekindles his efforts for a World Government, with Israel apparently being the only autonomous nation. This push continues through the rest of the 1940s. In 1952, Einstein, who had been instrumental in the creation of the State of Israel, both politically and economically, is offered the presidency of Israel. He declines. In 1953, he spends his time attacking the McCarthy Committee, and he supports Communists such as J. Robert Oppenheimer. He encourages civil disobedience in response to the McCarthy trials. Finally, on April 18, 1955, this filthy Jewish demagogue dies.

Dead, the Jews no longer had to worry about Einstein making stupid statements. His death was just the beginning of his usage and exploitation by World Jewry. The Jewish-controlled media continued to promote the myth of this Super-Jew long after his death, and as more and more of the men who knew better died off, the Jews were more and more able to aggrandize his myth and lie more boldly. This brazen lying has culminated in the Jew-controlled Time magazine naming Einstein AThe Person of the Century@ at the close of 1999.

It may be demonstrated that the Jewish lies have become more bold with the passage of time because Einstein was never named AMan of the Year@ while he was alive, but now, over forty years after his death, he is named APerson of the Century.@

Einstein was given this title in spite of the clear-cut choice for the APerson of the Century,@ Adolf Hitler. Hitler was indeed named AMan of the Year@ while he was still living by Time magazine, and according to a December 27, 1999, article in the USA Today, Einstein was chosen over Adolf Hitler because of the perceived Anasty public relations fallout@ that would accompany that choice; yet in Internet polling by Time, Hitler finished third and was the top serious candidate. Still the issue of Time magazine dedicated to Einstein, which has articles by men with names like Isaacson, Golden, Stein, Rudenstine, and Rosenblatt, is interesting to read.

For one, they found it necessary to include an article rationalizing why they did not pick the obvious choice, Adolf Hitler. But more interesting is the article by Stephen Hawking which purports to be a history of the theory of relativity. In it, Hawking admits many of the things in this article, such as the fact that Hilbert published the General Theory of Relativity before Einstein and that Fitz Gerald and Lorentz deduced the concept of relativity long before Einstein. Hawking also writes,

AEinstein was deeply disturbed by the work of Werner Heisenberg in Copenhagen, Paul Dirac in Cambridge and Erwin Schrödinger in Zurich, who developed a new picture of reality called quantum mechanics. Einstein was horrified by this Most scientists, however, accepted the validity of the new quantum laws because they showed excellent agreement with observations They are the basis of modern developments in chemistry, molecular biology and electronics and the foundation of the technology that has transformed the world in the past half-century.@

This is all very true, yet the same magazine credits Einstein with all of the modern developments that Hawking names, even through Einstein was so stupid as to be vehemently against the most important idea of modern

science, just as he opposed Schrödinger's work in unified field theory which was far ahead of its time.

The same magazine admits that Asuccess eluded@ Einstein in the field of explaining the contradictions between relativity and quantum mechanics. Today, these contradictions are explained by the unified field theory, but Einstein, who proves himself to be one of the least intelligent of 20th century scientists, refused to believe in either quantum theory or the unified field theory.

To name Einstein as AThe Person of the Century@ is one of the most ludicrous and absurd lies of all time, yet it has been successfully pulled off by Isaacson, Golden, Stein, Rudenstine, and Rosenblatt and the Jewish owners of Time magazine. If the Jews at Time wanted to give the title to an inventor or scientist, then the most obvious choice would have been men like Hilbert, Planck, or Heisenberg.

If they wanted to give it to the scientist who most fundamentally changed the landscape of 20th century science, then the obvious choice would be William Shockley. This Nobel prize winning scientist invented the transistor, which is the basis of all modern electronic devices and computers, everything from modern cars and telephones, VCRs and watches, to the amazing computers which have allowed incomprehensible advances in all fields of science. Without the transistor, all forms of science today would be basically in the same place that they were in the late 1940s.

However, the Jews cannot allow the due credit to go to William Shockley because he spent the majority of his scientific career demonstrating the genetic and mental inferiority of non-whites and arguing for their sterilization. His scientific, genetic views led the Jews to financially destroy Shockley who founded the first company in the Silicon Valley, his hometown, to develop computer chips. The Jews hired away his entire staff and used them to start Fairchild semiconductor, the company that today is known as Intel.

No the Jews could not let any of the truly great geniuses of our time be recognized, not the anti-Semite Henry Ford, not the great German scientists who helped the National Socialists in Germany, not Charles Lindbergh, who was sympathetic to National Socialist causes, and certainly not William Shockley, one of the most brilliant physicists and geneticists of our time. Instead, the Jews propped up the Zionist, Communist Albert Einstein who hated everything white.

After World War II, Einstein demonstrated his hatred of the White Race and of the Germans in particular in the following statements. He was asked what he thought about Germany and about re-educating the Germans after the war and said,

AThe nation has been on the decline mentally and morally since 1870Behind the Nazi party stands the German people, who elected Hitler after he had in his book and in his speeches made his shameful intentions clear beyond the possibility of misunderstanding. The Germans can be killed or constrained after the war, but they cannot be re-educated to a democratic way of thinking and acting@

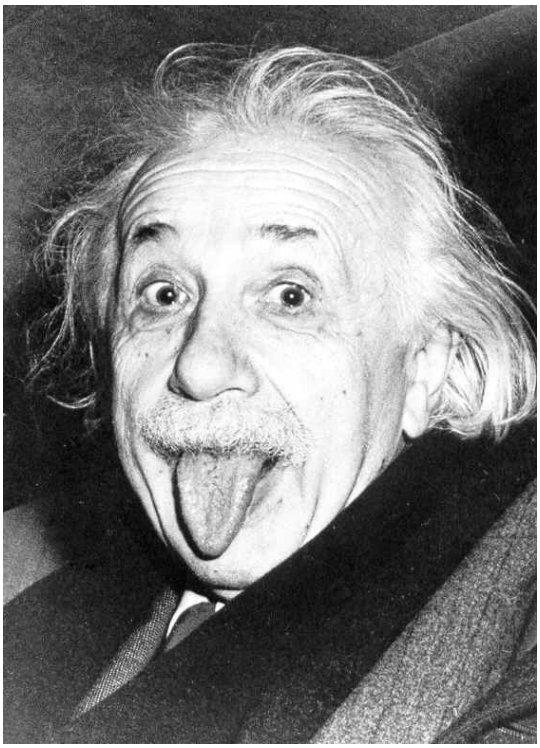
Einstein here is advocating the murder of Germans, because he feels that this is the only way that they can be kept in check. He is right about one thing, the Germans did knowingly support the cause of National Socialism, but what Einstein is attacking is Christianity, because it was Christianity that led the German people to overwhelmingly support National Socialism.

It was the German Christian Faith Movement and the Christian Social Party of men like Karl Lueger that led the German people to their understanding of Jews. The Jew Daniel Goldhagen has recently shown the Christian basis of National Socialism in his book, Hitler's Willing Executioners: Ordinary Germans and the Holocaust, and the book Why The Jews? by Prager and Telushkin similarly proves the Christian origins of what the Jews call 'anti-Semitism.' Einstein understood this and Einstein, like all Jews, hated Christianity.

So what Einstein was really advocating was the killing and constraining of all true Christians, not just German Christians. This is the true purpose and intent of Zionism and the demagogue Einstein was merely a tool of World Zionism and Jewry towards this end.

Zionistic Jews understand that true, primitive Christianity is the mortal enemy of mongrel Judaism. This is why the Jews, like Einstein, hated Nazi Germany so much, for National Socialist Germany advocated primitive,

positive Christianity in the 24th point of its Party Platform.



The Einstein Hoax

The joke's on us

"Ein stein" means "one stone", a metaphor for half a brain

Albert Einstein: A Jewish Myth

by Dr. Paul Bowers, B.S., M.E., Ch.D.

One of the statements of Adolf Hitler most often quoted by the Jewish media is the following from *Mein Kampf*, I:10:

> "The great masses of people ... will more easily fall victims to a big lie than to a small one."

Of course, Hitler is quoted out of context in an attempt to portray this statement as Hitler's own, personal philosophy or strategy. But if we read this selection in context, we find that he is

speaking of the Jews who had ruined his country, and he is trying to explain how the German people fell victim to Jewish lies. In fact, Herr Hitler even tells us what this great lie is that duped the German people into being controlled by the Jews. He continues:

> "Those who know best this truth about the possibilities of the application of untruth and defamation, however, were at all times the Jews; for their entire existence is built on one single great lie, namely, that here one had to deal with a religious brotherhood, while in fact one has to deal with a race - what a race! As such they have been nailed down forever, in an eternally correct sentence of fundamental truth, by one of the greatest minds of mankind; he called them 'the great masters of lying.' He who does not realize this or does not want to believe this will never be able to help truth to victory in this world."

Hitler here was referring to Arthur Schopenhauer, the eminent 19th century German philosopher who was outspoken regarding the true nature of Jews. We do not need to rely upon the opinions of German philosophers and political leaders regarding this character trait of the Jews, for Jesus Christ has said of the Jews,

> **"You are of your father the Diabolical One, and the lusts of your father you wish to do. That one was a murderer from the beginning, and he has not stood in the truth because there is no truth in him. When he speaks a lie, he speaks of his own, because he is a liar, and the father of it"** (John 8:44 AST).

Furthermore, the New Testament warns us not to listen to "Judaizing myths" (Titus 1:14). But Jewish myths are exactly what destroyed Germany and what have destroyed America today. Herr Hitler may have been correct in what he felt was the greatest Jewish lie, but there are many, many more which have had a damning effect on the white race. One of the greatest is certainly the lie of the Hebrew Masoretic Text and the removal of the Greek Septuagint from the hands of white Christians, but each Jewish myth stings with the same poisonous venom. One of the great Jewish myths of the 20th century is Albert Einstein.

Albert Einstein is held up by the Jewish liars as a rare genius who drastically changed the field of theoretical physics. As such, he is made an idol to young people and his very name has become synonymous with genius. The truth, however, is very different. The reality is that Einstein was an inept, moronic Jew who could not even tie his own shoelaces; he contributed nothing original to the field of quantum mechanics or any other science, but on the contrary he stole the ideas of other men and the Jewish media made him a hero.

When we actually examine the life of Albert Einstein, we find that his only brilliance lies in his ability to plagiarize and steal other people's ideas, passing them off as his own.

Einstein's education, or lack thereof, is an important part of this story. The *Encyclopedia Britannica* says of Einstein's early education that he "showed little scholastic ability." It also says that at the age of 15, "with poor grades in history, geography, and languages, he left school with no diploma." Einstein himself wrote in a school paper of his "lack of imagination and practical ability." In 1895, Einstein failed a simple entrance exam to an engineering school in Zurich. This exam consisted mainly of mathematical problems, and Einstein showed himself to

be mathematically inept in this exam. He then entered a lesser school hoping to use it as a stepping stone to the engineering school he could not get into, but after graduating in 1900, he still could not get a position at the engineering school! Unable to go to the school as he had wanted, he got a job (with the help of a friend) at the patent office in Bern. He was to be a technical expert third class, which meant that he was too incompetent for a higher qualified position. Even after publishing his so-called groundbreaking papers of 1905 and after working in the patent office for six years, he was only elevated to a second class standing. Remember, the work he was doing at the patent office, for which he was only rated third class, was not quantum mechanics or theoretical physics, but was reviewing technical documents for patents of every day things; yet he was barely qualified.

He would work at the patent office until 1909, all the while continuously trying to get a position at a university, but without success. All of these facts are true, but now begins the Jewish myth. Supposedly, while working a full time job, without the aid of university colleagues, a staff of graduate students, a laboratory, or any of the things normally associated with an academic setting, Einstein in his spare time wrote four ground-breaking essays in the field of theoretical physics and quantum mechanics that were published in 1905. Many people have recognized the impossibility of such a feat, including Einstein himself, and therefore Einstein has led people to believe that many of these ideas came to him in his sleep, out of the blue, because indeed that is the only logical explanation of how an admittedly inept moron could have written such documents at the age of 26 without any real education. However, a simpler explanation exists: he stole the ideas and plagiarized the papers.

Therefore, we will look at each of these ideas and discover the source of each. It should be remembered that these ideas are presented by Einstein's worshippers as totally new and completely different, each of which would change the landscape of science. These four papers dealt with the following four ideas, respectively:

1. The foundation of the photon theory of light;
2. The equivalence of energy and mass;
3. The explanation of Brownian motion in liquids;
4. The special theory of relativity.

Let us first look at the last of these theories, the theory of relativity. This is perhaps the most famous idea falsely attributed to Einstein. Specifically, this 1905 paper dealt with what Einstein called the Special Theory of Relativity (the General Theory would come in 1915). This theory contradicted the traditional Newtonian mechanics and was based upon two premises: 1) in the absence of acceleration, the laws of nature are the same for all observers; and 2) since the speed of light is independent of the motion of its source, then the time interval between two events is longer for an observer in whose frame of reference the events occur at different places than for an observer in whose frame of reference the events occur in the same place. This is basically the idea that time passes more slowly as one's velocity approaches the speed of light, relative to slower velocities where time would pass faster.

This theory has been validated by modern experiments and is the basis for modern physics. But these two premises are far from being originally Einstein's. First of all, the idea that the speed of

light was a constant and was independent of the motion of its source was not Einstein's at all, but was proposed by the Scottish scientist James Maxwell. Maxwell studied the phenomenon of light extensively and first proposed that it was electromagnetic in nature. He wrote an article to this effect for the 1878 edition of the *Encyclopedia Britannica*. His ideas prompted much debate, and by 1887, as a result of his work and the ensuing debate, the scientific community, particularly Lorentz, Michelson, and Morley reached the conclusion that the velocity of light was independent of the velocity of the observer. Thus, this piece of the Special Theory of Relativity was known 27 years before Einstein wrote his paper.

This debate over the nature of light also led Michelson and Morley to conduct an important experiment, the results of which could not be explained by Newtonian mechanics. They observed a phenomenon caused by relativity but they did not understand relativity. They had attempted to detect the motion of the earth through ether, which was a medium thought to be necessary for the propagation of light.

In response to this problem, in 1889, the Irish physicist George FitzGerald, who had also first proposed a mechanism for producing radio waves, wrote a paper which stated that the results of the Michelson-Morley experiment could be explained if,

> "... the length of material bodies changes, according as they are moving through the ether or across it, by an amount depending on the square of the ratio of their velocities to that of light."

This is the theory of relativity, 13 years before Einstein's paper! [Note: see critique]

Furthermore, in 1892, Hendrik Lorentz, from The Netherlands, proposed the same solution and began to greatly expand the idea. All throughout the 1890's, both Lorentz and FitzGerald worked on these ideas and wrote articles strangely similar to Einstein's Special Theory detailing what is now known as the Lorentz-FitzGerald Contraction. In 1898, the Irishman Joseph Larmor wrote down equations explaining the Lorentz-FitzGerald contraction and its relativistic consequences, 7 years before Einstein's paper. By 1904, Lorentz transformations, the series of equations explaining relativity, were published by Lorentz. They describe the increase of mass, the shortening of length, and the time dilation of a body moving at speeds close to the velocity of light. In short, by 1904, everything in Einstein's paper regarding the Special Theory of Relativity had already been published.

The Frenchman Poincaré had, in 1898, written a paper unifying many of these ideas. He stated seven years before Einstein's paper that,

> "... we have no direct intuition about the equality of two time intervals. The simultaneity of two events or the order of their succession, as well as the equality of two time intervals, must be defined in such a way that the statements of the natural laws be as simple as possible."

Anyone who has read Einstein's 1905 paper will immediately recognize the similarity and the lack of originality on the part of Einstein. Thus we see that the only thing original about the paper was the term 'Special Theory of Relativity.' Everything else was plagiarized. Over the

next few years, Poincaré became one of the most important lecturers and writers regarding relativity, but he never, in any of his papers or speeches, mentioned Albert Einstein. Thus, while Poincaré was busy bringing the rest of the academic world up to speed regarding relativity, Einstein was still working in the patent office in Bern and no one in the academic community thought it necessary to give much credence or mention to Einstein's work. Most of these early physicists knew that he was a fraud.

This brings us to the explanation of Brownian motion, the subject of another of Einstein's 1905 papers. Brownian motion describes the irregular motion of a body arising from the thermal energy of the molecules of the material in which the body is immersed. The movement had first been observed by the Scottish botanist Robert Brown in 1827. The explanation of this phenomenon has to do with the Kinetic Theory of Matter, and it was the American Josiah Gibbs and the Austrian Ludwig Boltzmann who first explained this occurrence, not Albert Einstein. In fact, the mathematical equation describing the motion contains the famous Boltzmann constant, k. Between these two men, they had explained by the 1890s everything in Einstein's 1905 paper regarding Brownian motion.

The subject of the equivalence of mass and energy was contained in a third paper published by Einstein in 1905. This concept is expressed by the famous equation E=mc^2. Einstein's biographers categorize this as "his most famous and most spectacular conclusion." Even though this idea is an obvious conclusion of Einstein's earlier relativity paper, it was not included in that paper but was published as an afterthought later in the year. Still, the idea of energy-mass equivalence was not original with Einstein.

That there was an equivalence between mass and energy had been shown in the laboratory in the 1890s by both J.J. Thomsom of Cambridge and by W. Kaufmann in Göttingen. In 1900, Poincaré had shown that there was a mass relationship for all forms of energy, not just electromagnetic energy. Yet, the most probable source of Einstein's plagiarism was Friedrich Hasenöhrl, one of the most brilliant, yet unappreciated physicists of the era. Hasenöhrl was the teacher of many of the German scientists who would later become famous for a variety of topics. He had worked on the idea of the equivalence of mass and energy for many years and had published a paper on the topic in 1904 in the very same journal which Einstein would publish his plagiarized version in 1905. For his brilliant work in this area, Hasenörhl had received in 1904 a prize from the prestigious Vienna Academy of Sciences.

Furthermore, the mathematical relationship of mass and energy was a simple deduction from the already well-known equations of Scottish physicist James Maxwell. Scientists long understood that the mathematical relationship expressed by the equation E=mc^2 was the logical result of Maxwell's work, they just did not believe it. Thus, the experiments of Thomson, Kaufmann, and finally, and most importantly, Hasenörhl, confirmed Maxwell's work. It is ludicrous to believe that Einstein developed this postulate, particularly in light of the fact that Einstein did not have the laboratory necessary to conduct the appropriate experiments.

In this same plagiarized article of Einstein's, he suggested to the scientific community, "Perhaps it will prove possible to test this theory using bodies whose energy content is variable to a high degree (e.g., salts of radium)." This remark demonstrates how little Einstein understood about

science, for this was truly an outlandish remark. By saying this, Einstein showed that he really did not understand basic scientific principles and that he was writing about a topic that he did not understand. In fact, in response to this article, J. Precht remarked that such an experiment "lies beyond the realm of possible experience."

The last subject dealt with in Einstein's 1905 papers was the foundation of the photon theory of light. Einstein wrote about the photoelectric effect. The photoelectric effect is the release of electrons from certain metals or semiconductors by the action of light. This area of research is particularly important to the Einstein myth because it was for this topic that he unjustly received his 1922 Nobel Prize.

But again, it is not Einstein, but Wilhelm Wien and Max Planck who deserve the credit. The main point of Einstein's paper, and the point for which he is given credit, is that light is emitted and absorbed in finite packets called quanta. This was the explanation for the photoelectric effect. The photoelectric effect had been explained by Heinrich Hertz in 1888. Hertz and others, including Philipp Lenard, worked on understanding this phenomenon. Lenard was the first to show that the energy of the electrons released in the photoelectric effect was not governed by the intensity of the light but by the frequency of the light. This was an important breakthrough.

Wien and Planck were colleagues and they were the fathers of modern day quantum theory. By 1900, Max Planck, based upon his and Wien's work, had shown that radiated energy was absorbed and emitted in finite units called quanta. The only difference in his work of 1900 and Einstein's work of 1905 was that Einstein limited himself to talking about one particular type of energy - light energy. But the principles and equations governing the process in general had been deduced by Planck in 1900. Einstein himself admitted that the obvious conclusion of Planck's work was that light also existed in discrete packets of energy. Thus, nothing in this paper of Einstein's was original.

After the 1905 papers of Einstein were published, the scientific community took little notice and Einstein continued his job at the patent office until 1909 when it was arranged for him to take a position at a school by World Jewry. Still, it was not until a 1919 newspaper headline that he gained any notoriety.

With Einstein's academic appointment in 1909, he was placed in a position where he could begin to use other people's work as his own more openly. He engaged many of his students to look for ways to prove the theories he had supposedly developed, or ways to apply those theories, and then he could present the research as his own or at least take partial credit. In this vein, in 1912, he began to try and express his gravitational research in terms of a new, recently developed calculus, which was conducive to understanding relativity. This was the beginning of his General Theory of Relativity, which he would publish in 1915. But the mathematical work was not done by Einstein - he was incapable of it. Instead, it was performed by the mathematician Marcel Grossmann, who in turn used the mathematical principles developed by Berhard Riemann, who was the first to develop a sound non-Euclidean geometry, which is the basis of all mathematics used to describe relativity.

The General Theory of Relativity applied the principles of relativity to the universe; that is, to the gravitational pull of planets and their orbits, and the general principle that light rays bend as

they pass by a massive object. Einstein published an initial paper in 1913 based upon the work which Grossmann did, adapting the math of Riemann to Relativity. But this paper was filled with errors and the conclusions were incorrect. It appears that Grossmann was not smart enough to figure it out for Einstein. So Einstein was forced to look elsewhere to plagiarize his General Theory. Einstein published his correct General Theory of Relativity in 1915, and said prior to its publication that he, "...completely succeeded in convincing Hilbert and Klein." He is referring to David Hilbert, perhaps the most brilliant mathematician of the 20th century, and Felix Klein, another mathematician who had been instrumental in the development of the area of calculus that Grossmann had used to develop the General Theory of Relativity for Einstein.

Einstein's statement regarding the two men would lead the reader to believe that Einstein had changed Hilbert's and Klein's opinions regarding General Relativity, and that he had influenced them in their thinking. However, the exact opposite is true. Einstein stole the majority of his General Relativity work from these two men, the rest being taken from Grossmann. Hilbert submitted for publication, a week before Einstein completed his work, a paper which contained the correct field equations of General Relativity. What this means is that Hilbert wrote basically the exact same paper, with the same conclusions, before Einstein did. Einstein would have had an opportunity to know of Hilbert's work all along, because there were Jewish friends of his working for Hilbert. Yet, even this was not necessary, for Einstein had seen Hilbert's paper in advance of publishing his own. Both of these papers were, before being printed, delivered in the form of a lecture.

Einstein presented his paper on November 25, 1915 in Berlin and Hilbert had presented his paper on November 20 in Göttingen. On November 18, Hilbert received a letter from Einstein thanking him for sending him a draft of the treatise Hilbert was to deliver on the 20th. So, in fact, Hilbert had sent a copy of his work at least two weeks in advance to Einstein before either of the two men delivered their lectures, but Einstein did not send Hilbert an advance copy of his. Therefore, this serves as incontrovertible proof that Einstein quickly plagiarized the work and then presented it, hoping to beat Hilbert to the punch. Also, at the same time, Einstein publicly began to belittle Hilbert, even though in the previous summer he had praised him in an effort to get Hilbert to share his work with him. Hilbert made the mistake of sending Einstein this draft copy, but still he delivered his work first.

Not only did Hilbert publish his work first, but it was of much higher quality than Einstein's. It is known today that there are many problems with assumptions made in Einstein's General Theory paper. We know today that Hilbert was much closer to the truth. Hilbert's paper is the forerunner of the unified field theory of gravitation and electromagnetism and of the work of Erwin Schrödinger, whose work is the basis of all modern day quantum mechanics. [Note: see critique].

That the group of men discussed so far were the actual originators of the ideas claimed by Einstein was known by the scientific community all along. In 1940, a group of German physicists meeting in Austria declared that "before Einstein, Aryan scientists like Lorentz, Hasenöhrl, Poincaré, etc., had created the foundations of the theory of relativity..."

However, the Jewish media did not promote the work of these men. The Jewish media did not

promote the work of David Hilbert, but instead they promoted the work of the Jew Albert Einstein. As we mentioned earlier, this General Theory, as postulated by Hilbert first and in plagiarized form by Einstein second, stated that light rays should bend when they pass by a massive object. In 1919, during the eclipse of the Sun, light from distant stars passing close to the Sun was observed to bend according to the theory. This evidence supported the General Theory of Relativity, and the Jewish-controlled media immediately seized upon the opportunity to prop up Einstein as a hero, at the expense of the true genius, David Hilbert.

On November 7th, 1919, the London *Times* ran an article, the headline of which proclaimed, "Revolution in science - New theory of the Universe - Newtonian ideas overthrown." This was the beginning of the force-feeding of the Einstein myth to the masses. In the following years, Einstein's earlier 1905 papers were propagandized and Einstein was heralded as the originator of all the ideas he had stolen. Because of this push by the Jewish media, in 1922, Einstein received the Nobel Prize for the work he had stolen in 1905 regarding the photoelectric effect.

The establishment of the Einstein farce between 1919 and 1922 was an important *coup* for world Zionism and Jewry. As soon as Einstein had been established as an idol to the popular masses of England and America, his image was promoted as the rare genius that he is erroneously believed to be today. As such, he immediately began his work as a tool for World Zionism. The masses bought into the idea that if someone was so brilliant as to change our fundamental understanding of the universe, then certainly we ought to listen to his opinions regarding political and social issues. This is exactly what World Jewry wanted to establish in its ongoing effort of social engineering. They certainly did not want someone like David Hilbert to be recognized as rare genius. After all, this physicist had come from a strong German, Christian background. His grandfather's two middle names were 'Fürchtegott Leberecht' or 'Fear God, Live Right.' In August of 1934, the day before a vote was to be taken regarding installing Adolf Hitler as President of the Reich, Hilbert signed a proclamation in support of Adolf Hitler, along with other leading German scientists, that was published in the German newspapers. So the Jews certainly did not want David Hilbert receiving the credit he deserved.

The Jews did not want Max Planck receiving the credit he deserved either. This German's grandfather and great-grandfather had been important German theologians, and during World War II he would stay in Germany throughout the war, supporting his fatherland the best he could.

The Jews certainly did not want the up-and-coming Erwin Schrödinger to be heralded as a genius to the masses. This Austrian physicist would go on to teach at Adolf Hitler University in Austria, and he wrote a public letter expressing his support for the Third Reich. This Austrian's work on the unified field theory was a forerunner of modern physics, even though it had been criticized by Einstein, who apparently could not understand it.

The Jews did not want to have Werner Heisenberg promoted as a rare genius, even though he would go on to solidify quantum theory and contribute to it greatly, as well as develop his famous uncertainty principle, in addition to describing the modern atom and nucleus and the binding energies that are essential to modern chemistry. No, the Jews did not want Heisenberg promoted as a genius because he would go on to head the German atomic bomb project and

serve prison time after the war for his involvement with the Third Reich.

No, the Jews did not want to give credit to any of a number of white Germans, Austrians, Irishmen, Frenchmen, Scotsmen, Englishmen, and even Americans who had contributed to the body of knowledge and evidence from which Einstein plagiarized and stole his work. Instead, they needed to erect Einstein as their golden calf, even though he repeatedly and often embarrassed himself with his nonfactual or nearsighted comments regarding the work he had supposedly done. For example, in 1934, the *Pittsburgh Post-Gazette* ran a front page article in which Einstein gave an "emphatic denial" regarding the idea of practical applications for the "energy of the atom." The article says,

> "But the 'energy of the atom' is something else again. If you believe that man will someday be able to harness this boundless energy-to drive a great steamship across the ocean on a pint of water, for instance-then, according to Einstein, you are wrong..."

Again, Einstein clearly did not understand the branch of physics he had supposedly founded, though elsewhere in the world at the time theoretical research was underway that would lead to the atomic bomb and nuclear energy. But after Einstein was promoted as a god in 1919, he made no real attempts to plagiarize any other work. Rather, he began his real purpose - evangelizing for the cause of Zionism and World Jewry. Though he did publish other articles after this time, all of them were co-authored by at least one other person, and in each instance, Einstein had little if anything to do with the research that led to the articles; he was merely recruited by the co-authors in order to lend credence to their work. Thus freed of the pretense of academia, Einstein began his assault for World Zionism.

In 1921, Einstein made his first visit to the United States on a fund-raising tour for the Hebrew University in Jerusalem and to promote Zionism. In April of 1922, Einstein used his status to gain membership in a Commission of the League of Nations. In February of 1923, Einstein visits Tel Aviv and Jerusalem. In June of 1923, he becomes a founding member of the Association of Friends of the New Russia. In 1926, Einstein took a break from his Communist and Zionistic activities to again embarrass himself scientifically by criticizing the work of Schrödinger and Heisenberg. Following a brief illness, he resumes his Zionistic agenda, wanting an independent Israel and at the same time a World Government.

In the 1930s he actively campaigns against all forms of war, although he would reverse this position during World War II when he advocated war against Germany and the creation of the atomic bomb, which he thought was impossible to build. In 1939 and 1940, Einstein, at the request of other Jews, wrote two letters to Roosevelt urging an American program to develop an atomic bomb to be used on Germany - not Japan. Einstein would have no part in the actual construction of the bomb, theoretical or practical, because he lacked the skills for either.

In December of 1946, Einstein rekindles his efforts for a World Government, with Israel apparently being the only autonomous nation. This push continues through the rest of the 1940s. In 1952, Einstein, who had been instrumental in the creation of the State of Israel, both politically and economically, is offered the presidency of Israel. He declines. In 1953, he spends his time attacking the McCarthy Committee, and he supports Communists such as J. Robert Oppenheimer. He encourages civil disobedience in response to the McCarthy trials. Finally, on

April 18, 1955, this filthy Jewish demagogue dies.

Dead, the Jews no longer had to worry about Einstein making stupid statements. His death was just the beginning of his usage and exploitation by World Jewry. The Jewish-controlled media continued to promote the myth of this Super-Jew long after his death, and as more and more of the men who knew better died off, the Jews were more and more able to aggrandize his myth and lie more boldly. This brazen lying has culminated in the Jew controlled *Time* magazine naming Einstein "The Person of the Century" at the close of 1999. It may be demonstrated that the Jewish lies have become more bold with the passage of time because Einstein was never named "Man of the Year" while he was alive, but now, over forty years after his death, he is named "Person of the Century."

Einstein was given this title in spite of the clear-cut choice for the "Person of the Century," Adolf Hitler. Hitler was indeed named "Man of the Year" while he was still living by *Time* magazine, and according to a December 27, 1999, article in the *USA Today*, Einstein was chosen over Adolf Hitler because of the perceived "nasty public relations fallout" that would accompany that choice; yet in internet polling by *Time,* Hitler finished third and was the top serious candidate. Still the issue of *Time* magazine dedicated to Einstein, which has articles by men with names like Isaacson, Golden, Stein, Rudenstine, and Rosenblatt, is interesting to read. For one, they found it necessary to include an article rationalizing why they did not pick the obvious choice, Adolf Hitler. But more interesting is the article by Stephen Hawking which purports to be a history of the theory of relativity. In it, Hawking admits many of the things in this article, such as the fact that Hilbert published the General Theory of Relativity before Einstein and that FitzGerald and Lorentz deduced the concept of relativity long before Einstein. Hawking also writes,

> "Einstein...was deeply disturbed by the work of Werner Heisenberg in Copenhagen, Paul Dirac in Cambridge and Erwin Schrödinger in Zurich, who developed a new picture of reality called quantum mechanics. ... Einstein was horrified by this ... Most scientists, however, accepted the validity of the new quantum laws because they showed excellent agreement with observations ... They are the basis of modern developments in chemistry, molecular biology and electronics and the foundation of the technology that has transformed the world in the past half-century."

This is all very true, yet the same magazine credits Einstein with all of the modern developments that Hawking names, even through Einstein was so stupid as to be vehemently against the most important idea of modern science, just as he opposed Schrödinger's work in unified field theory which was far ahead of its time. The same magazine admits that "success eluded" Einstein in the field of explaining the contradictions between relativity and quantum mechanics. Today, these contradictions are explained by the unified field theory, but Einstein, who proves himself to be one of the least intelligent of 20th century scientists, refused to believe in either quantum theory or the unified field theory.

To name Einstein as "The Person of the Century" is one of the most ludicrous and absurd lies of all time, yet it has been successfully pulled off by Isaacson, Golden, Stein, Rudenstine, and Rosenblatt and the Jewish owners of *Time* magazine. If the Jews at *Time* wanted to give the title

to an inventor or scientist, then the most obvious choice would have been men like Hilbert, Planck, or Heisenberg. If they wanted to give it to the scientist who most fundamentally changed the landscape of 20th century science, then the obvious choice would be William Shockley. This Nobel prize winning scientist invented the transistor, which is the basis of all modern electronic devices and computers, everything from modern cars and telephones, VCRs and watches, to the amazing computers which have allowed incomprehensible advances in all fields of science. Without the transistor, all forms of science today would be basically in the same place that they were in the late 1940s.

However, the Jews cannot allow the due credit to go to William Shockley because he spent the majority of his scientific career demonstrating the genetic and mental inferiority of non-whites and arguing for their sterilization. His scientific, genetic views led the Jews to financially destroy Shockley who founded the first company in the Silicon Valley, his hometown, to develop computer chips. The Jews hired away his entire staff and used them to start Fairchild semiconductor, the company that today is known as Intel.

No the Jews could not let any of the truly great geniuses of our time be recognized, not the anti-Semite Henry Ford, not the great German scientists who helped the National Socialists in Germany, not Charles Lindbergh, who was sympathetic to National Socialist causes, and certainly not William Shockley, one of the most brilliant physicists and geneticists of our time. Instead, the Jews propped up the Zionist, Communist Albert Einstein who hated everything white.

After World War II, Einstein demonstrated his hatred of the White Race and of the Germans in particular in the following statements. He was asked what he thought about Germany and about re-educating the Germans after the war and said,

> "The nation has been on the decline mentally and morally since 1870...Behind the Nazi party stands the German people, who elected Hitler after he had in his book and in his speeches made his shameful intentions clear beyond the possibility of misunderstanding. ... The Germans can be killed or constrained after the war, but they cannot be re-educated to a democratic way of thinking and acting..."

Einstein here is advocating the murder of Germans, because he feels that this is the only way that they can be kept in check. He is right about one thing, the Germans did knowingly support the cause of National Socialism, but what Einstein is attacking is Christianity, because it was Christianity that led the German people to overwhelmingly support National Socialism. It was the German Christian Faith Movement and the Christian Social Party of men like Karl Lueger that led the German people to their understanding of Jews. The Jew Daniel Goldhagen has recently shown the Christian basis of National Socialism in his book, *Hitler's Willing Executioners: Ordinary Germans and the Holocaust,* and the book *Why The Jews?* by Prager and Telushkin similarly proves the Christian origins of what the Jews call 'anti-Semitism.' Einstein understood this and Einstein, like all Jews, hated Christianity. So what Einstein was really advocating was the killing and constraining of all true Christians, not just German Christians. This is the true purpose and intent of Zionism and the demagogue Einstein was merely a tool of World Zionism and Jewry towards this end.

Zionistic Jews understand that true, primitive Christianity is the mortal enemy of mongrel Judaism. This is why the Jews, like Einstein, hated Nazi Germany so much, for National Socialist Germany advocated primitive, positive Christianity in the 24th point of its Party Platform.

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http://www.biblebelievers.org.au/einstein.htm

Albert Einstein

-- was he a thief, a liar and a plagiarist?

ALBERT EINSTEIN is held up as "a rare genius," who drastically changed the field of theoretical physics. However, using the technique known as 'The Often-Repeated Lie=Truth,' he has been made an idol to young people, and his very name has become synonymous with genius.

THE TRUTH, HOWEVER, IS VERY DIFFERENT. Einstein was an inept and moronic person, who could not even tie his own shoelaces; he contributed NOTHING ORIGINAL to the field of quantum mechanics, nor any other science. On the contrary -- he stole the ideas of others, and the Jew-controlled media made him a 'hero.'

When we actually examine the life of Albert Einstein, we find that his only 'brilliance' was in his ability to PLAGIARIZE and STEAL OTHER PEOPLE'S IDEAS, PASSING THEM OFF AS HIS OWN. Einstein's education, or lack thereof, is an important part of this story.

The Encyclopedia Britannica says of Einstein's early education that he "showed little scholastic ability." It also says that at the age of 15, "with poor grades in history, geography, and languages, he left school with no diploma." Einstein himself wrote in a school paper of his "lack of imagination and practical ability." In 1895, Einstein failed a simple entrance exam to an engineering school in Zurich.

This exam consisted mainly of mathematical problems, and Einstein showed himself to be mathematically inept in this exam. He then entered a lesser school hoping to use it as a stepping stone to the engineering school he could not get into, but after graduating in 1900, he still could not get a position at the engineering school!

Unable to go to the school as he had wanted, he got a job (with the help of a friend) at the patent office in Bern. He was to be a technical expert third

class, which meant that he was not competent to hold a higher qualified position. Even after publishing his so-called ground-breaking papers of 1905 and after working in the patent office for six years, he was only elevated to a second class standing. Remember, the work he was doing at the patent office, for which he was only rated third class, was not quantum mechanics or theoretical physics, but was reviewing technical documents for patents of every day things; yet he was barely qualified.

He would work at the patent office until 1909, all the while continuously trying to get a position at a university, but without success. All of these facts are true, but now begins the myth.

Supposedly, while working a full time job, without the aid of university colleagues, a staff of graduate students, a laboratory, or any of the things normally associated with an academic setting, Einstein in his spare time wrote four ground-breaking essays in the field of theoretical physics and quantum mechanics that were published in 1905.

Many people have recognized the impossibility of such a feat, including Einstein himself, and therefore Einstein has led people to believe that many of these ideas came to him in his sleep, out of the blue, because indeed that is the only logical explanation of how an admittedly inept moron could have written such documents at the age of 26 without any real education. THE TRUTH IS: HE STOLE THE IDEAS AND PLAGIARIZED THE PAPERS.

Therefore, we will look at each of these ideas and discover the source of each. It should be remembered that these ideas are presented by Einstein's worshipers as totally new and completely different, each of which would change the landscape of science. These four papers dealt with the following four ideas, respectively:

1. The foundation of the photon theory of light;
2. The equivalence of energy and mass;
3. The explanation of Brownian motion in liquids;
4. The special theory of relativity.

Let us first look at the last of these theories, the theory of relativity. This is perhaps the most famous idea falsely attributed to Einstein. Specifically, this 1905 paper dealt with what Einstein called the Special Theory of Relativity (the General Theory would come in 1915).

This theory contradicted the traditional Newtonian mechanics and was based upon two premises:

1. In the absence of acceleration, the laws of nature are the same for all observers; and
2. Since the speed of light is independent of the motion of its source, then the time interval between two events is longer for an observer in whose frame of reference the events occur at different places than for an observer in whose frame of reference the events occur in the same place.

This is basically the idea that time passes more slowly as one's velocity approaches the speed of light, relative to slower velocities where time would pass faster.

This theory has been validated by modern experiments and is the basis for modern physics. But these two premises are far from being originally Einstein's. FIRST OF ALL, THE IDEA THAT THE SPEED OF LIGHT WAS A CONSTANT AND WAS INDEPENDENT OF THE MOTION OF ITS SOURCE WAS NOT EINSTEIN'S AT ALL, BUT WAS PROPOSED BY THE SCOTTISH SCIENTIST JAMES MAXWELL in 1878.

Maxwell studied the phenomenon of light extensively and first proposed that it was electromagnetic in nature.

James Maxwell wrote an article to this effect for the 1878 edition of the Encyclopedia Britannica. His ideas prompted much debate, and by 1887, as a result of his work and the ensuing debate, the scientific community, particularly Lorentz, Michelson, and Morley reached the conclusion that the velocity of light was independent of the velocity of the observer. Thus, this piece of the Special Theory of Relativity was known 27 years before Einstein wrote his paper.

This debate over the nature of light also led Michelson and Morley to conduct an important experiment, the results of which could not be explained by Newtonian mechanics. They observed a phenomenon caused by relativity but they did not understand relativity.

They had attempted to detect the motion of the earth through ether, which was a medium thought to be necessary for the propagation of light. In response to this problem, in 1880, the Irish physicist George Fitzgerald, who had also first proposed a mechanism for producing radio waves, wrote a paper which stated that the results of the Michelson Morley experiment could be explained if, ". . . the length of material bodies change, according as they are moving through the either or across it by an amount depending on the square of the ratio of their velocities to that of light."

THIS IS THE THEORY OF RELATIVITY, 13 YEARS BEFORE EINSTEIN'S PAPER!

FURTHER . . . IN 1892, HENDRIK LORENTZ, of the Netherlands, proposed the same solution and began to greatly expand the idea. All throughout the 1890's, both Lorentz and Fitzgerald worked on these ideas and wrote articles strangely similar to Einstein's Special Theory detailing what is now known as the Lorentz-Fitzgerald Contraction.

In 1898, the Irishman Joseph Larmor wrote down equations explaining the Lorentz-Fitzgerald contraction and its relativistic consequences, 7 years before Einstein's paper. By 1904, "Lorentz transformations," the series of equations explaining relativity, were published by Lorentz. They describe the increase of mass, the shortening of length, and the time dilation of a body moving at speeds close to the velocity of light. In short, by 1904, everything in "Einstein's paper" regarding the Special Theory of Relativity had already been published.

The Frenchman Poincaré , had, in 1898, written a paper unifying many of these ideas. He stated seven years before Einstein's paper: ". . . we have no direct intuition about the equality of two time intervals. The simultaneity of two events or the order of their succession, as well as the equality of two time intervals, must be defined in such a way that the statements of the natural laws be as simple as possible."

Professor Umberto Bartocci, a mathematical historian, of the University of Perugia claims that Olinto De Pretto, an industrialist from Vicenza, published the equation E=mc^2 in a scientific magazine, *Atte*, in 1903. Einstein allegedly used De Pretto's insight in a major paper published in 1905, but De Pretto was never acclaimed.

De Pretto had stumbled on the equation, but not the theory of relativity, while speculating about ether in the life of the universe, said Prof Bartocci. It was republished in 1904 by Veneto's Royal Science Institute, but the equation's significance was not understood.

According to Professor Bartocci, a Swiss Italian named Michele Besso alerted Einstein to the research and in 1905 Einstein published his own work. It took years for his breakthrough to be grasped. When the penny finally dropped, De Pretto's contribution was overlooked while Einstein went on to become the century's most famous scientist. De Pretto died in 1921.

"De Pretto did not discover relativity but there is no doubt that he was the first to use the equation. That is hugely significant. I also believe, though it's impossible to prove, that Einstein used De Pretto's research," said Professor Bartocci, who has written a book on the subject. (The Guardian Unlimited).

Anyone who has read Einstein's 1905 paper will immediately recognize the similarity and the lack of originality on the part of Einstein.

Thus, we see that the only thing original about the paper was the term 'Special Theory of Relativity.' EVERYTHING ELSE WAS PLAGIARIZED. Over the next few years, Poincaré, became one of the most important lecturers and writers regarding relativity, but he never, in any of his papers or speeches, mentioned Albert Einstein.

Thus, while Poincaré, was busy bringing the rest of the academic world up to speed regarding relativity, Einstein was still working in the patent office in Bern and no one in the academic community thought it necessary to give much credence or mention to Einstein's work. Most of these early physicists knew that he was a fraud.

This brings us to the explanation of Brownian motion, the subject of another of Einstein's 1905 papers. Brownian motion describes the irregular motion of a body arising from the thermal energy of the molecules of the material in which the body is immersed. The movement had first been observed by the Scottish botanist Robert Brown in 1827.

The explanation of this phenomenon has to do with the Kinetic Theory of Matter, and it was the American Josiah Gibbs and the Austrian Ludwig Boltzmann who first explained this occurrence, not Albert Einstein. In fact, the mathematical equation describing the motion contains the famous Boltzmann constant, k. Between these two men, they had explained by the 1890s everything in Einstein's 1905 paper regarding Brownian motion.

The subject of the equivalence of mass and energy was contained in a third paper published by Einstein in 1905. This concept is expressed by the famous equation E=mc2. Einstein's biographers categorize this as "his most famous and most spectacular conclusion." Even though this idea is an obvious conclusion of Einstein's earlier relativity paper, it was not included in that paper but was published as an afterthought later in the year. Still, the

idea of energy-mass equivalence was not original with Einstein.

That there was an equivalence between mass and energy had been shown in the laboratory in the 1890s by both J. J. Thomsom of Cambridge and by W. Kaufmann in Göttingen. In 1900, Poincaré, had shown that there was a mass relationship for all forms of energy, not just electromagnetic energy. Yet, the most probable source of Einstein's plagiarism was Friedrich Hasenöhrl, one of the most brilliant, yet unappreciated physicists of the era.

Hasenöhrl was the teacher of many of the German scientists who would later become famous for a variety of topics. He had worked on the idea of the equivalence of mass and energy for many years and had published a paper on the topic in 1904 in the very same journal which Einstein would publish his plagiarized version in 1905. For his brilliant work in this area, Hasenöhrl had received in 1904 a prize from the prestigious Vienna Academy of Sciences.

Furthermore, the mathematical relationship of mass and energy was a simple deduction from the already well-known equations of Scottish physicist James Maxwell. Scientists long understood that the mathematical relationship expressed by the equation E=mc2 was the logical result of Maxwell's work, they just did not believe it.

THUS, THE EXPERIMENTS OF THOMSON, KAUFMANN, AND FINALLY, AND MOST IMPORTANTLY, HASENÖRHL, CONFIRMED MAXWELL'S WORK. IT IS LUDICROUS TO BELIEVE THAT EINSTEIN DEVELOPED THIS POSTULATE, particularly in light of the fact that Einstein did not have the laboratory necessary to conduct the appropriate experiments.

In this same plagiarized article of Einstein's, he suggested to the scientific community, "Perhaps it will prove possible to test this theory using bodies whose energy content is variable to a high degree (e.g., salts of radium)."

This remark demonstrates how little Einstein understood about science, for this was truly an outlandish remark. By saying this, Einstein showed that he really did not understand basic scientific principles and that he was writing about a topic that he did not understand. In fact, in response to this article, J. Precht remarked that such an experiment "lies beyond the realm of possible experience."

The last subject dealt with in Einstein's 1905 papers was the foundation of the photon theory of light. Einstein wrote about the photoelectric effect. The photoelectric effect is the release of electrons from certain metals or semiconductors by the action of light. This area of research is particularly important to the Einstein myth because it was for this topic that he UNJUSTLY received his 1922 Nobel Prize.

But AGAIN IT IS NOT EINSTEIN, BUT WILHELM WIEN AND MAX PLANCK WHO DESERVE THE CREDIT. The main point of Einstein's paper, and the point for which he is given credit, is that light is emitted and absorbed in finite packets called quanta. This was the explanation for the photoelectric effect. The photoelectric effect had been explained by Heinrich Hertz in 1888. Hertz and others, including Philipp Lenard, worked on understanding this phenomenon.

Lenard was the first to show that the energy of the electrons released in the photoelectric effect was not governed by the intensity of the light but by the frequency of the light. This was an important breakthrough.

Wien and Planck were colleagues and they were the fathers of modern day quantum theory. By 1900, Max Planck, based upon his and Wien's work, had shown that radiated energy was absorbed and emitted in finite units called quanta. The only difference in his work of 1900 and Einstein's work of 1905 was that Einstein limited himself to talking about one particular type of energy -- light energy. But the principles and equations governing the process in general had been deduced by Planck in 1900. Einstein himself admitted that the obvious conclusion of Planck's work was that light also existed in discrete packets of energy. Thus, nothing in this paper of Einstein's was original.

After the 1905 papers of Einstein were published, the scientific community took little notice and Einstein continued his job at the patent office until 1909 when it was arranged by World Jewry for him to take a position at a school.

Still, it was not until a 1919 A Jewish newspaper headline that he gained any notoriety. With Einstein's academic appointment in 1909, he was placed in a position where he could begin to use other people's work as his own more openly.

He engaged many of his students to look for ways to prove the theories he had supposedly developed, or ways to apply those theories, and then he could present the research as his own or at least take partial credit.

In this vein, in 1912, he began to try and express his gravitational research in terms of a new, recently developed calculus, which was conducive to understanding relativity. This was the beginning of his General Theory of Relativity, which he would publish in 1915.

BUT THE MATHEMATICAL WORK WAS NOT DONE BY EINSTEIN -- HE WAS INCAPABLE OF IT. Instead, it was performed by the mathematician Marcel Grossmann, who in turn used the mathematical principles developed by Berhard Riemann, who was the first to develop a sound non-Euclidean geometry, which is the basis of all mathematics used to describe relativity.

The General Theory of Relativity applied the principles of relativity to the universe; that is, to the gravitational pull of planets and their orbits, and the general principle that light rays bend as they pass by a massive object. Einstein published an initial paper in 1913 based upon the work which Grossmann did, adapting the math of Riemann to Relativity. But this paper was filled with errors and the conclusions were incorrect.

It appears that Grossmann was not smart enough to figure it out for Einstein. So Einstein was forced to look elsewhere to plagiarize his General Theory. Einstein published his correct General Theory of Relativity in 1915, and said prior to its publication that he, "completely succeeded in convincing Hilbert and Klein." He is referring to David Hilbert, perhaps the most brilliant mathematician of the 20th century, and Felix Klein, another mathematician who had been instrumental in the development of the area of calculus that Grossmann had used to develop the General Theory of

Relativity for Einstein.

Einstein's statement regarding the two men would lead the reader to believe that Einstein had changed Hilbert's and Klein's opinions regarding General Relativity, and that he had influenced them in their thinking.

However, the exact opposite is true. EINSTEIN STOLE THE MAJORITY OF HIS GENERAL RELATIVITY WORK FROM THESE TWO MEN, THE REST BEING TAKEN FROM GROSSMANN. HILBERT SUBMITTED FOR PUBLICATION, A WEEK BEFORE EINSTEIN COMPLETED HIS WORK, A PAPER WHICH CONTAINED THE CORRECT FIELD EQUATIONS, OF GENERAL RELATIVITY.

What this means is that Hilbert wrote basically the exact same paper, with the same conclusions, before Einstein did. Einstein would have had an opportunity to know of Hilbert's work all along, because there were friends of his working for Hilbert. Yet, even this was not necessary, for Einstein had seen Hilbert's paper in advance of publishing his own. Both of these papers were, before being printed, delivered in the form of a lecture.

Einstein presented his paper on November 25, 1915 in Berlin and Hilbert had presented his paper on November 20 in Göttingen. On November 18, Hilbert received a letter from Einstein thanking him for sending him a draft of the treatise Hilbert was to deliver on the 20th. So, in fact, Hilbert had sent a copy of his work at least two weeks in advance to Einstein before either of the two men delivered their lectures, but Einstein did not send Hilbert an advance copy of his.

Therefore, THIS SERVES AS INCONTROVERTIBLE PROOF THAT EINSTEIN QUICKLY PLAGIARIZED THE WORK AND THEN PRESENTED IT, HOPING TO BEAT HILBERT TO THE PUNCH. Also, at the same time, Einstein publicly began to belittle Hilbert, even though in the previous summer he had praised him in an effort to get Hilbert to share his work with him. Hilbert made the mistake of sending Einstein this draft copy, but still he delivered his work first.

Not only did Hilbert publish his work first, but it was of much higher quality than Einstein's. It is known today that there are many problems with assumptions made in Einstein's General Theory paper. We know today that Hilbert was much closer to the truth. Hilbert's paper is the forerunner of the unified field theory of gravitation and electromagnetism and of the work of Erwin Schrödinger, whose work is the basis of all modern day quantum mechanics.

That the group of men discussed so far were the actual originators of the ideas claimed by Einstein was known by the scientific community all along. In 1940, a group of German physicists meeting in Austria declared that "before Einstein, Aryan scientists like Lorentz, Hasenöhrl, Poincaré, etc., had created the foundations of the theory of relativity." However the Jewish media did not promote the work of these men. The Jewish media did not promote the work of David Hilbert, but instead they promoted the work of the Jew Albert Einstein.

As we mentioned earlier, this General Theory, as postulated by Hilbert first and in plagiarized form by Einstein second, stated that light rays should bend when they pass by a massive object. In 1919, during the eclipse of the

Sun, light from distant stars passing close to the Sun was observed to bend according to the theory. This evidence supported the General Theory of Relativity, and the Jew-controlled media immediately seized upon the opportunity to prop up Einstein as a hero, at the expense of the true genius, David Hilbert.

On November 7th, 1919, the London Times ran an article, the headline of which proclaimed, "Revolution in science -- New theory of the Universe -- Newtonian ideas overthrown." This was the beginning of the force-feeding of the Einstein myth to the masses. In the following years, Einstein's earlier 1905 papers were propagandized and Einstein was heralded as the originator of all the ideas he had stolen. Because of this push by the Jewish media, in 1922, EINSTEIN RECEIVED THE NOBEL PRIZE FOR THE WORK HE HAD STOLEN IN 1905 REGARDING THE PHOTOELECTRIC EFFECT.

The establishment of the Einstein farce between 1919 and 1922 was an important coup for world Zionism and Jewry. As soon as Einstein had been established as an idol to the popular masses of England and America, his image was promoted as the rare genius that he is erroneously believed to be today.

As such, he immediately began his work as a tool for World Zionism. The masses bought into the idea that if someone was so brilliant as to change our fundamental understanding of the universe, then certainly we ought to listen to his opinions regarding political and social issues.

This is exactly what World Jewry wanted to establish in its ongoing effort of social engineering. They certainly did not want someone like David Hilbert to be recognized as rare genius. After all, this physicist had come from a strong German, Christian background. His grandfather's two middle names were 'Fürchtegott Leberecht' or 'Fear God, Live Right.' In August of 1934, the day before a vote was to be taken regarding installing Adolf Hitler as President of the Reich, Hilbert signed a proclamation in support of Adolf Hitler, along with other leading German scientists, that was published in the German newspapers. So the Jews certainly did not want David Hilbert receiving the credit he deserved.

The Jews did not want Max Planck receiving the credit he deserved either. This German's grandfather and great-grandfather had been important German theologians, and during World War II he would stay in Germany throughout the war, supporting his fatherland the best he could.

The Jews certainly did not want the up-and-coming Erwin Schrödinger to be heralded as a genius to the masses. This Austrian physicist would go on to teach at Adolf Hitler University in Austria, and he wrote a public letter expressing his support for the Third Reich. This Austrian's work on the unified field theory was a forerunner of modern physics, even though it had been criticized by Einstein, who apparently could not understand it.

The Jews did not want to have Werner Heisenberg promoted as a rare genius, even though he would go on to solidify quantum theory and contribute to it greatly, as well as develop his famous uncertainty principle, in addition to describing the modern atom and nucleus and the binding energies that are essential to modern chemistry.

NO, THE JEWS DID NOT WANT HEISENBERG PROMOTED AS A GENIUS BECAUSE HE WOULD GO ON TO HEAD THE GERMAN ATOMIC BOMB PROJECT AND SERVE PRISON TIME AFTER THE WAR FOR HIS INVOLVEMENT WITH THE THIRD REICH.

No, the Jews did not want to give credit to any of a number of Germans, Austrians, Irishmen, Frenchmen, Scotsmen, Englishmen, and even Americans who had contributed to the body of knowledge and evidence from which Einstein plagiarized and stole his work.

Instead, they needed to erect Einstein as their golden calf, even though he repeatedly and often embarrassed himself with his nonfactual or nearsighted comments regarding the work he had supposedly done. For example, in 1934, the Pittsburgh Post-Gazette ran a front page article in which Einstein gave an "emphatic denial" regarding the idea of practical applications for the "energy of the atom." The article says, "But the 'energy of the atom' is something else again. If you believe that man will someday be able to harness this boundless energy-to drive a great steamship across the ocean on a pint of water, for instance -- then, according to Einstein, you are wrong"

Again, Einstein clearly did not understand the branch of physics he had supposedly founded, though elsewhere in the world at the time theoretical research was underway that would lead to the atomic bomb and nuclear energy.

But after Einstein was promoted as a god in 1919, he made no real attempts to plagiarize any other work. Rather, he began his real purpose -- evangelizing for the cause of Zionism and World Jewry. Though he did publish other articles after this time, all of them were co-authored by at least one other person, and in each instance, Einstein had little if anything to do with the research that led to the articles; he was merely recruited by the co-authors in order to lend credence to their work. Thus freed of the pretense of academia, Einstein began his assault for World Zionism.

Lewis L. Strauss, the Zionist Chairman of the US Atomic Commission, must have had in mind storing the world stock of A and H bombs in the neutral country of Israel (also chosen for the United Nations permanent headquarters) for safekeeping to 'satisfy Russian demands,' when, as reported in the *London Jewish Chronicle* of 11th December, 1953, he 'assisted' President Eisenhower in writing the speech in which Eisenhower told the UN General Assembly that the USA would be prepared to ease international tension by handing over her Atom and Hydrogen weapons to UNO. Eisenhower does not hesitate to accept the advice of Strauss, although this Zionist financier is senior partner in the New York International Banking firm of Kuhn, Loeb and Co. which in 1917, under the direction of Jacob Schiff, then the acknowledged leader of world Jewry, financed the Bolshevist revolutionary Trotsky to the extent of 20 million dollars.

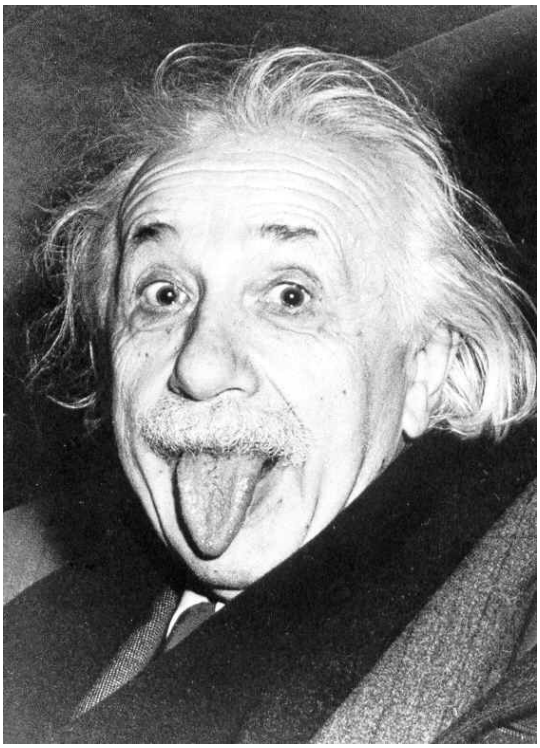
Albert Einstein, the Zionist scientist, (described by *'PRAVDA'* as one of the ten best friends of the Soviet Union in the USA) was also thinking along the same lines when he persuaded Roosevelt (Redfield) to authorize research into nuclear fission, and recommended the employment of other Zionist scientists, who were later to pass the result of the researches to the Soviet Union.

Oppenheimer, the chief Einstein appointee, now in disgrace for Communist sympathies, and holding up production of the hydrogen bombs until Russia came into possession of its secrets: Pontecorvo, the entire host of Zionist scientists and agents working for Communism in the notorious spy rings of America, Canada, Australia and Great Britain: all have obviously been striving to bring about the present situation.

It is this overriding ambition which drives Zionists, even the most wealthy, to support Communism, either openly or secretly, only to bring the world to a point where it would seem it *must* accept their long envisaged 'peace plan.' "One of the major reasons for my visit to the United States," said the mayor of Jerusalem, according to the *South African Jewish Times* of 14th March, 1952, "is to interest Americans in the beautification of Jerusalem, the Capital of the World, no less than the Capital of Israel."

It all has been decided as described above. Why has so little been heard about it? For the simple reason that IT HAS BEEN DECIDED. The matter will not be thrown open for Gentile discussion in the popular (?) press UNTIL the Nations are browbeaten to the point where they are ready to acknowledge the Zionists' "International Super-Government, and WITH SUBMISSIVENESS".

(Note: On November 21, 1954, Czecho-Slovakia called upon the Western Powers to delay signing the Paris Agreement regarding the re-armament of West Germany, until they had discussed with the Russian bloc an agreement which might eventually result in a United States of Europe. A 'United States of Europe' was the aim of Trotsky stated in *'Bolshevism and World Peace,'* published in 1918. "The task of the proletariat is to create a still more powerful fatherland with a far greater power of resistance -- the Republican United States of Europe, as the foundation of the United States of the World"). einstein.htm



The Einstein Hoax

The joke's on us

"Ein stein" means "one stone", a metaphor for half a brain

"The nation has been on the decline mentally and morally since 1870...Behind the Nazi party stands the German people, who elected Hitler after he had in his book and in his speeches made his shameful intentions clear beyond the possibility of misunderstanding. ... The Germans can be killed or constrained after the war, but they cannot be re-educated to a democratic way of thinking and acting..." Albert Einstein

This "brilliant" jew is, of course, referring to a people who were almost totally destroyed in a world war, have succeeded in ridding themselves of the scourge of jews, and within half a century rebuilt their country to achieve family incomes almost twice as high as ours

WHAT THE EXPERIMENTS SAY

Tom Van Flandern

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(metaresearch.org)

Reference: http://www.ldolphin.org/vanFlandern/gravityspeed.html

Abstract

Standard experimental techniques exist to determine the propagation speed of forces. When we apply these techniques to gravity, they all yield propagation speeds too great to measure, substantially faster than light-speed. This is because gravity, in contrast to light, has no detectable aberration or propagation delay for its action, even for cases (such as binary pulsars) where sources of gravity accelerate significantly during the light time from source to target. By contrast, the finite propagation speed of light causes radiation pressure forces to have a non-radial component causing orbits to decay (the "Poynting-Robertson effect"); but gravity has no counterpart force proportional to v/c to first order. General relativity (GR) explains these features by suggesting that gravitation, unlike electromagnetic forces, is a pure geometric effect of curved Space-Time, not a force of nature that propagates. Gravitational radiation, which surely does propagate at light-speed but is a fifth order effect in v/c, is too small to play a role in explaining this difference in behavior between gravity and ordinary forces of nature. Problems with the causality principle also exist for GR in this connection, such as explaining how the external fields between binary black holes manage to continually update without benefit of communication with the masses hidden behind event horizons. These causality problems would be solved without any change to the mathematical formalism of GR, but only to its interpretation, if gravity is once again taken to be a propagating force of nature in flat Space-Time with the propagation speed indicated by observational evidence and experiments: not less than 2x1010c. Such a change of perspective requires no change in the assumed character of gravitational radiation or its light-speed propagation. Although faster-than-light force propagation speeds do violate Einstein special relativity (SR), they are in accord with Lorentzian Relativity, which has never been experimentally distinguished from SR-at least, not if favor of SR. Indeed, far from upsetting much of current physics, the main changes induced by this new perspective are beneficial to areas where physics has been struggling, such as explaining experimental evidence for non-locality in quantum physics, the dark matter issue in cosmology, and the possible unification of forces. Recognition of a faster-than-light-speed propagation of gravity, as indicated by all existing experimental evidence, may be the key to taking conventional physics to the next plateau.

Introduction

The most amazing thing I was taught as a graduate student of celestial mechanics at Yale in the 1960s was that all gravitational interactions between bodies in all dynamical systems had to be taken as instantaneous. This seemed unacceptable on two counts. In the first place, it seemed to

be a form of "action at a distance." Perhaps no one has so elegantly expressed the objection to such a concept better than Sir Isaac Newton: "That one body may act upon another at a distance through a vacuum, without the mediation of any thing else, by and through which their action and force may be conveyed from one to the other, is to me so great an absurdity, that I believe no man who has in philosophical matters a competent faculty of thinking, can ever fall into it" (See Hoffman, 1983). But mediation requires propagation, and finite bodies should be incapable of propagate at infinite speeds since that would require infinite energy. So instantaneous gravity seemed to have an element of magic to it.

The second objection was that we had all been taught that Einstein's Special Relativity (SR), an experimentally well established theory, proved that nothing could propagate in forward time at a speed greater than that of light in a vacuum. Indeed, as astronomers we were taught to calculate orbits using instantaneous forces; then extract the position of some body along its orbit at a time of interest, and calculate where that position would appear as seen from Earth by allowing for the finite propagation speed of light from there to here. It seemed incongruous to allow for the finite speed of light from the body to the Earth, but to take the effect of Earth's gravity on that same body as propagating from here to there instantaneously. Yet that was the required procedure to get the correct answers.

These objections were certainly not new when I raised them. They have been raised and answered thousands of times in dozens of different ways over the years since General Relativity (GR) was set forth in 1916. Even today in discussions of gravity in USENET newsgroups on the Internet, the most frequently asked question and debated topic is "What is the speed of gravity?" It is only heard less often in the classroom because many teachers and most textbooks head off the question by hastily assuring students that gravitational waves propagate at the speed of light, leaving the firm impression, whether intended or not, that the question of gravity's propagation speed has already been answered.

Yet, anyone with a computer and orbit computation or numerical integration software can verify the consequences of introducing a delay into gravitational interactions. The effect on computed orbits is usually disastrous because conservation of angular momentum is destroyed. Expressed less technically by Sir Arthur Eddington, this means: "If the Sun attracts Jupiter towards its present position S, and Jupiter attracts the Sun towards its present position J, the two forces are in the same line and balance. But if the Sun attracts Jupiter toward its previous position S', and Jupiter attracts the Sun towards its previous position J', when the force of attraction started out to cross the gulf, then the two forces give a couple. This couple will tend to increase the angular momentum of the system, and, acting cumulatively, will soon cause an appreciable change of period, disagreeing with observations if the speed is at all comparable with that of light" Eddington, 1920, p.94). See Figure 1.

Indeed, it is widely accepted, even if less widely known, that the speed of gravity in Newton's Universal Law is unconditionally infinite (e.g., Misner et al., 1973, p.177). This is usually not mentioned in proximity to the statement that GR reduces to Newtonian gravity in the low-velocity, weak-field limit because of the obvious question it begs about how that can be true if the propagation speed in one model is the speed of light, and in the other model it is infinite.

The same dilemma comes up in many guises: Why do photons from the Sun travel in directions that are not parallel to the direction of Earth's gravitational acceleration toward the Sun?

Why do total eclipses of the Sun by the Moon reach maximum eclipse about 40 seconds before the Sun and Moon's gravitational forces align? How do binary pulsars anticipate each other's future position, velocity, and acceleration faster than the light time between them would allow? How can black holes have gravity when nothing can get out because escape speed is greater than the speed of light?

Herein we will examine the experimental evidence bearing on the issue of the speed of propagation of gravity. By gravity, we mean the gravitational "force" from some source body. By force, we mean that which gives rise to the acceleration of target bodies through space.

NOTE: Orbiting bodies do accelerate through space even if gravity is geometry and not a true force. For example, one spacecraft following another in the same orbit can stretch a tether between the two. The taut tether then describes a straight line, and the path of both spacecraft will be curved with respect to it.

We will examine the explanations offered by GR for these phenomena. And we will confront the dilemma that remains when we are through: whether to give up our existing interpretation of GR, or the principle of causality.

Propagation Delay versus Aberration

To understand how propagation speeds of phenomena are normally measured, it will be useful to discuss propagation or transit delay and aberration, and the distinction between them. The points in this section are illustrated in Figure 2.

In the top half of the figure, we consider the view from the source. A fixed source body on the left (for example, the Sun) sends a projectile (the arrow, which could also be a photon) toward a moving target (for example, the Earth). Infinitely far to the right are shown a bright (large, aberration 5-pointed) star and a faint (small, 4-pointed) star, present to define directions in space. Because of transit delay, in order to hit the target, the source body must send the projectile when it is seen in the direction of the faint star, but send it toward the direction of the bright star, leading speed to the radial projectile speed. For small angles, this ratio equals the lead angle in radians.

In the bottom half of the figure, we consider the view from the target, which will consider itself at rest and the source moving. By the principle of relativity, this view is just as valid since no experiment can determine which of two bodies in uniform, linear relative motion is "really moving" and which is not. The projectile will be seen to approach from the retarded position of the source, which is the spatial direction headed toward the faint star. The angle between the true and retarded positions of the source, which equals the angle between the two stars, is called "aberration." It will readily be recognized as the same angle defined in the first view due to transit delay.

Indeed, that is generally true: The initial and final positions of the target as viewed from the source differ by the motion of the target during the transit delay of the projectile. The same

difference between initial and final positions of the source as viewed from the target is called the angle of aberration. Expressed in angular form, both are equal, and are manifestations of the finite propagation speed of the projectile as viewed from different frames. So the most basic way to measure the speed of propagation of any entity, whether particle or wave or dual entity or neither, is to measure transit delay, or equivalently, the angle of aberration.

Fact: Gravity Has No Aberration

1. The effect of aberration on orbits is not seen

As viewed from the Earth's frame, light from the Sun has aberration. Light requires about 8.3 minutes to arrive from the Sun, during which time the Sun seems to move through an angle of 20 arc seconds. The arriving sunlight shows us where the Sun was 8.3 minutes ago. The true, instantaneous position of the Sun is about 20 arcs seconds east of its visible position, and we will see the Sun in its true present position about 8.3 minutes into the future. In the same way, star positions are displaced from their average position by up to 20 arcs seconds, depending on the relative direction of the Earth's motion around the Sun. This well-known phenomenon is classical aberration, and was discovered by the astronomer Bradley in 1728.

Orbit computations must use true, instantaneous positions of all masses when computing accelerations due to gravity for the reason given by Eddington. When orbits are complete, the visible position of any mass can be computed by allowing for the delay of light traveling from that mass to Earth. This difference between true and apparent positions of bodies is not merely an optical illusion, but is a physical difference due to transit delay that can alter an observer's momentum. For example, small bodies such as dust particles in circular orbit around the Sun experience a mostly radial force due to the radiation pressure of sunlight. But because of the finite speed of light, a portion of that radial force acts in a transverse direction, like a drag, slowing the orbital speed of the dust particles and causing them to eventually spiral into the Sun. This phenomenon is known as the Poynting-Robertson effect.

If gravity were a simple force that propagated outward from the Sun at the speed of light, as radiation pressure does, its mostly radial effect would also have a small transverse component because of the motion of the target. Analogous to the Poynting-Robertson effect, the magnitude of that tangential force acting on the Earth would be 0.0001 of the Sun's radial force, which is the ratio of the Earth's orbital speed (30 km/sec) to the speed of this hypothetical force of gravity moving at light-speed (300,000 km/sec). It would act continuously, but would tend to speed the Earth up rather than slow it down because gravity is attractive and radiation pressure is repulsive. Nonetheless, the net effect of such a force would be to double the Earth's distance from the Sun in 1200 years. There can be no doubt from astronomical observations that no such force is acting. The computation using the instantaneous positions of Sun and Earth is the correct one. The computation using retarded positions is in conflict with observations. From the absence of such an effect, Laplace set a lower limit to the speed of propagation of classical gravity of about 108c, where c is the speed of light (Laplace, 1825, pp. 642-645 of translation).

We will use this formula later to set limits on vg.

2. Gravity and light do not act in parallel directions

There is no cause to doubt that photons arriving now from the Sun left 8.3 minutes ago, and arrive at Earth from the direction against the sky that the Sun occupied that long ago. But the analogous situation for gravity is less obvious, and we must always be careful not to mix in the consequences of light propagation delays. Another way, besides aberration, to represent what gravity is doing is to measure the acceleration vector for the Earth's motion, and ask if it is parallel to the direction of the arriving photons. If it is, that would argue that gravity propagated to Earth with the same speed as light; and conversely.

Such measurements of Earth's acceleration through space are now easy to make using precise timing data from stable pulsars in various directions on the sky. Any movement of the Earth in any direction is immediately reflected in a decreased delay in the time of arrival of pulses toward that direction, and an increased delay toward the opposite direction. In principle, Earth's orbit could be determined from pulsar timings alone. In practice, the orbit determined from planetary radar ranging data is checked with pulsar timing data and found consistent with it to very high precision.

How then does the direction of Earth's acceleration compare with the direction of the visible Sun? By direct calculation from geometric ephemerides fitted to such observations, such as those published by the U.S. Naval Observatory or the Development Ephemerides of the Jet Propulsion Laboratory, the Earth accelerates toward a point 20 arc seconds in front of the visible Sun, where the Sun will appear to be in 8.3 minutes. In other words, the acceleration now is toward the true, instantaneous direction of the Sun now, and is not parallel to the direction of the arriving solar photons now. This is additional evidence that forces from electromagnetic radiation pressure and from gravity do not have the same propagation speed.

An old saying among Air Force bomber pilots: "You get the most flak when you're directly over the target."

3. The solar eclipse test

Yet another manifestation of the difference between the propagation speeds of gravity and light can be seen in the case of solar eclipses (Van Flandern, 1993, pp. 49-50). The Moon, being relatively nearby and sharing the Earth's 30 km/sec orbital motion around the Sun, has relatively little aberration (0.7 arc seconds, due to the Moon's 1 km/sec orbital speed around Earth). The Sun, as mentioned earlier, has an aberration of just over 20 arc seconds. It takes the Moon about 38 seconds of time to move 20 arc seconds on the sky relative to the Sun. Since the observed times of eclipses of the Sun by the Moon agree with predicted times to within a couple of seconds, we can use the orbits of the Sun and the Moon near times of maximum solar eclipse to compare the time of predicted gravitational maximum with the time of visible maximum eclipse.

In practice, the maximum gravitational perturbation by the Sun on the orbit of the Moon near eclipses may be taken as the time when the lunar and solar longitudes are equal. Details of the procedure are provided in the reference cited. We find that maximum eclipse occurs roughly 381.9 seconds of time, on average, before the time of gravity maximum. If gravity is a propagating force, this 3-body (Sun-Moon-Earth) test implies that gravity propagates at least 20 times faster than light.

Electromagnetic Analogies and Gravitational Radiation

1. Myth: Gravity from an accelerating source experiences light-time delay

In electromagnetism, it is said that moving charges anticipate each other's linear motion, but not acceleration, and that acceleration causes the emission of photons. If gravity behaved in an analogous way, moving masses would anticipate each other's linear motion, but not acceleration, and accelerating masses would emit gravitational radiation. Indeed, the orbit of binary pulsar P5R1913+16 is observed to slowly decay at a rate close to that predicted by GR from the emission of gravitational radiation. Could that be evidence for changes in gravity propagating at light-speed?

First, we will calculate the acceleration predicted for any two stars if each star responds to the linearly extrapolated retarded position and velocity, but not acceleration, of its companion over one light time between the stars. This would be consistent with the electromagnetic analogy. In Figure 3, we will consider the orbit of component A relative to component B during the light time between the two stars. We will then consider three positions of component A: its true, Ar instantaneous position, At; its retarded position one light time ago, Ar; and its linearly extrapolated position one light time ahead from its retarded position, Ac. As before, let the product of the gravitational constant and the total system mass be μ, and the radius of A's circular orbit around B be a. Also let the speed of light be c, and A's orbital period be P. Finally, ? is the angle at B through which A moves during the light time a/c, and ? is the angle at B between Ac and At. By construction, the linear distance from Ar to Ac is equal to the length of the arc from Ar to At, and both are equal to a?.

The difference in the distance of Ac and At from B causes only small, non-cumulative effects on the orbit. However, the angle ? causes the extrapolated retarded position to feel a transverse force component that continually increases the orbital period P. From the triangles in the figure we see that ? = ? -tan-1(a ?/a). Since ? is normally a very small angle, we can expand the arc tangent into a series and retain only significant terms. The result is ? = (1/3)(?3). However, ? is 2p/P times the light time, or 2pa/cP. So the transverse perturbing acceleration B, which is R times the radial orbital acceleration μ/a2, can be found from B = 8/3μa(p/cP)3. Finally, from Danby, 1988, p.327, and with some minor change of variables and simplification, we arrive at:

We could have seen the essence of this result at the outset. Binary pulsars decay as they radiate away angular momentum, presumably in the form of gravitational radiation. However, a finite speed of propagation of gravitational force must add angular momentum to orbits. This is because the retarded position of any source of gravity must lie in the same direction relative to its true position as the tangential motion of the target body. Therefore, any delay in gravity will always pull the target in a direction that will increase its instantaneous orbital speed - the opposite of the effect of gravitational radiation.

In concluding this section, we should also note that, even in the solar system, the Sun moves around the barycenter in a path that often takes the barycenter a million kilometers or so from the Sun. So the idea that the Sun's field can be treated as "static" and unchanging is not a good approximation even for our own planetary system. The Sun's motion during the light time to the planets is appreciable, yet its gravity field is continually updated without apparent delay.

2. Myth: Gravitational waves contribute to gravitational force

Few subjects in physics are in such a state of confusion as is the subject of gravitational waves. Normally, this term is synonymous with gravitational radiation, a hypothetical, ultra-weak disturbance of Space-Time induced by a certain type of asymmetric change in the distribution of matter called a quadrupole moment. It is supposed to be analogous to accelerating charges emitting photons. This form of radiation is predicted by GR. The acceleration of binary pulsar PSR1913+16 is said to be in accord with the predicted amount of gravitational radiation, and therefore to provide an indirect confirmation of the prediction. However, attempts to detect gravitational waves in the laboratory from any source have yet to yield events that have convinced a consensus of their reality. The LIGO experiment is being designed to provide definitive detections, assuming these waves exist.

When gravitational waves were predicted, it was natural to associate them with supernova explosions, since no known event in nature redistributes mass in space more rapidly. However, the explosion must be asymmetric to produce gravitational waves. Because the gravitational field of the supernova is changing rapidly during the explosion, it is natural to associate the production of gravitational waves with changes in gravitational fields. So far, so good.

However, many physicists do more than associate the two concepts, and consider that changes in gravitational fields are gravitational waves. The heart of this confusion is illustrated by the following passage from Synge, 1960: "uppose that a man, standing on the earth, holds in his hand a heavy club. At first the club hangs down toward the ground, but at a certain moment the man raises it quickly over his head. Any theory of gravitation recognizes that the club produces a gravitational field, however minute it may be, and that the action of the man changes that field, not only in his neighborhood, but throughout the whole universe. According to Newtonian theory, the effect is instantaneously felt on the Moon, on the Sun and in every remote nebula. Since we are not concerned with Newtonian theory, we do not have to discuss the absurdity of this. As relativists, familiar with the idea that no causal effect can travel faster than light, ...,we would guess that the change in the gravitational field of the moving club travels out into space with the speed of light. And we would call this moving disturbance a gravitational wave. Thus, on a very general basis, we must regard the physical existence of gravitational waves, so understood, as self-evident."

The sudden displacement of the club may cause a disturbance of space-time, which would be a form of gravitational radiation. Separately, if gravitation is itself some sort of wave phenomenon, changes in gravitational fields will propagate away from a source as waves. Now there is no doubt that changes in gravitational fields exist, or that they can be detected in the laboratory. Therefore, this phenomenon cannot be the same thing as gravitational radiation, since the latter has not yet been reliably detected, and its existence still emains unverified. However, both phenomena are called "gravitational waves" without further distinction. For the former type, we must look to ultra-small accelerations of distant, massive pulsars for some hint of their existence. For the latter type, we see indirect evidence of changes in the gravitational fields of Sun and Moon every day in the tides, or can measure them directly with a gravimeter. We can even measure gravitational field changes using small masses in a purely laboratory setting.

The consequences of this distinction become clearer when we are careful to distinguish sources and targets of gravity. Ordinary gravitational acceleration of a target results from some form of communication from a source of gravity that may or may not be carried from source to target in wave form. Separately, the acceleration of a target body must change the nearby space-time, and such changes seem likely to be propagated outward in wave form away from the target. If possible waves associated with sources of gravity (those that may induce acceleration in other bodies), and other possible waves induced by targets of gravity (those that result from acceleration), are not distinguished, we are certain to have massive confusion over the meaning of the very concept of "the speed of gravity."

In a binary pulsar, where both masses are comparable, both stars may emit gravitational radiation. But each would do so as a consequence of its acceleration induced by the other, not as a consequence of its own gravity. Moreover, as we noted earlier, gravitational waves in the sense of gravitational radiation cause orbiting bodies to lose angular momentum; whereas gravitational aberration that must accompany any finite speed of propagation of gravity from a source to a target would cause orbits to gain angular momentum.

Therefore, it seems fairly certain that, if gravitational radiation exists, its waves will propagate at the speed of light. In what way this type of disturbance of space-time may differ from very-long-wavelength electromagnetic disturbances of Space-Time, if indeed it does differ, remains to be seen.

By contrast, the speed of propagation of gravitational fields and of changes in those fields, whatever the nature of the propagating agents, are different matters, and pose a question we hope to answer in this paper.

Space-Time Curvature and Retarded Potentials

1. Is gravity caused by a curvature of space and time?

A common way to explain why gravity can appear to act instantaneously, yet still propagate with a delay, is the rubber sheet analogy (See cover illustration--top of page). A large mass sitting on a rubber sheet would make a large indentation, and that indentation would induce smaller nearby masses to role toward the indentation. This is an analogy for curved Space-Time, which is likewise supposed to be the cause of bodies accelerating toward large masses. The reasoning in the analogy further suggests that target bodies simply respond instantly to the local curvature of the underlying Space-Time medium (like the rubber sheet). Therefore, any delay associated with altering that local curvature would not produce aberration, and the target body would appear to respond instantaneously to the source unless the source suddenly changed its motion.

The rubber sheet analogy is represented as a way of visualizing why bodies attract one another. However, in that regard, it is highly defective. A target body sitting on the side of an indentation would stay in place, with no tendency to roll downhill, unless there were already a force such as gravity underneath the rubber sheet pulling everything downhill. And this failure of the analogy helps us identify the precise problem with the curved Space-Time description of gravity - the lack of causality. Without consideration of why a target body is induced to accelerate through

space, and how quickly it receives updates of information about how to accelerate through space, neither the Space-Time curvature explanation nor the rubber sheet analogy can help us understand why gravity appears to act so much faster than light.

Moreover, contrary to what the rubber sheet analogy implies, an orbiting body such as a spacecraft orbiting the Earth is not following the curvature of space near the Earth. As we remarked earlier, two spacecraft some distance apart in the same orbit could stretch a tether between them and pull it taut, thereby describing a straight line through space different from their orbital path. In more mathematical terms, the supposed curvature of Space-Time produced by a gravitational field is an effect proportional to the local gravitational potential N, the variable part of which is in turn proportional to v2/c2, where v is orbital speed. Yet, orbital curvature through space, like stellar aberration, is proportional to v/c, a much larger effect. For example, for the Earth orbiting the Sun, v/c is of order 10-4, and v2/c2 is of order l0-8. So we see that almost all of the acceleration of bodies through space is not a consequence of the curvature of space. In the GR explanation, the acceleration through space is due to the curvature of "Space-Time," a mathematical entity not to be confused with the combined separate concepts of space and time.

While relativists have always been partial to the curved Space-Time explanation of gravity, it is not an essential feature of GR. Eddington (1920, p.109) was already aware of the mostly equivalent "refracting medium" explanation for GR features, which retains Euclidean space and time in the same mathematical formalism. In essence, the bending of light, gravitational redshift, Mercury perihelion advance, and radar time delay can all be consequences of electromagnetic wave motion through an underlying refracting medium that is made denser in proportion to the nearness of a source of gravity (Van Flandern, 1993, pp. 62-67 and Van Flandern, 1994). And it is now known that even ordinary matter has certain electromagnetic-wave-like characteristics. The principal objection to this conceptually simpler refraction interpretation of GR is that a faster-than-light propagation speed for gravity itself is required. In the context of this paper, that cannot be considered as a fatal objection.

Lastly, we note experimental evidence from neutron interferometers that purports to demonstrate a failure of the geometric weak equivalence principle, that gravity is due to a curvature of Space-Time (Greenberger & Overhauser, 1980). This experiment confirmed the strong equivalence principle (local equivalence of a uniform acceleration and a gravitational field), but its results are incompatible with the geometrical weak equivalence principle because interference effects in Quantum Mechanics depend on the mass. This is because the wave nature of the neutron depends on the momentum of the neutron, which is mass times velocity. So all phase-dependent phenomena depend on the mass through the wavelength, a feature intrinsic to Quantum Mechanics.

Since the experiment confirms the applicability of quantum mechanics even in the presence of gravity, including this non-geometrical mass dependence, the experiment seems to be a step in the undermining of the purely geometrical point of view, and "tends to bother theorists who prefer to think of gravity as being intrinsically related to geometry," according to the authors.

2. Does General Relativity really reduce to Newtonian gravity in low-velocity, weak-field limit?

As we have already noted, Newtonian gravity propagates with unconditionally infinite speed. How, then, can GR reduce to Newtonian gravity in the weak-field, low-velocity limit? The answer is that conservation of angular momentum is implicit in the assumptions on which GR rests. However, as we have already seen, finite propagation speeds and conservation of angular momentum are incompatible. Therefore, GR was forced to claim that gravity is not a force that propagates in any classical sense, and that aberration does not apply.

In practice, this suppression of aberration is done through so-called "retarded potentials." In electromagnetism, these are called "Lienard-Wiechert potentials." For examples of the use of retarded potentials, see Misner et al., 1973, p. 1080 or Feynman, 1963, p. 214. Suppose we et f(x-bar, t) be the gravitational potential at a field point "x-bar" and time t, G be the gravitational constant, dV be an element of volume in the source of the potential, x-bar = (X, Y, Z) be the coordinates of that volume element in the source, ?(x-bar, T) be the matter density at point x-bar and time T, r-bar = x-bar - X-bar, r = |r-bar| be the distance from the source volume element at time T to the field point at time t, and v-bar be the relative velocity between the field point and the source. Then two different forms of retarded potentials in common use for gravitation are these:

However, in neither form of retarded potential is any consideration given to the transverse motion between source and target during the light time; i.e., the aberration. Ignoring aberration is logically equivalent to adopting an infinite propagation speed for gravitational force. That point is glossed over by emphasizing that the density distribution or the mutual distance is being taken at its retarded position, as if a finite propagation speed for gravity were being adopted. Nevertheless, the only practical consequence of a finite propagation speed that matters in 'most applications is missing from these potentials. And that clever trick then allows a theory with "gravity propagating at the speed of light" to be equivalent to a theory with infinite propagation speed in the weak-field, low velocity limit.

In short, both GR and Newtonian gravity use infinite propagation speeds with aberration equal to zero. In Newton's laws, that fact is explicitly recognized even though aberration and delay terms do not appear because of an infinity in their denominator. In GR, much effort has been expended in disguising the continued absence of the same delay terms by including retardation effects in ways that are presently unobservable and ignoring aberration. Every physicist and physics student should be at least annoyed at having been tricked by this sleight of hand, and should demand that the neglect of aberration be clearly justified by those who propose to do so.

Does a Gravitational Field Continuously Regenerate, or is it "Frozen?"

In attempts to describe how GR can affect distant bodies seemingly without delay, relativists often speak of the field of a body as if it were a rigid extension of the body itself If such a "static" field has no moving parts, it then would have no need of a propagation speed unless something changes. The objection to this picture is that it is acausal. Somehow, momentum is transferred from a source body to a target body. It seems impossible to conceive of a static field with literally no moving parts as capable of transferring momentum. This is the dilemma of the "rubber sheet" analogy again. Just because a rubber sheet or Space-Time is curved, why should a stationary target body on the slope of such a curve begin moving toward the source? What is the source of the momentum change?

To retain causality, we must distinguish two distinct meanings of the term "static." One meaning is unchanging in the sense of no moving parts. The other meaning is sameness from moment to moment by continual replacement of all moving parts. We can visualize this difference by thinking of a waterfall. A frozen waterfall is static in the first sense, and a flowing waterfall is static in the second sense. Both are essentially the same at every moment, yet the latter has moving parts capable of transferring momentum, and is made of entities that propagate.

Self-introduction of a first-timer in the sci.physics.relativity newsgroup: "Let me start out with the standard disclaimer ... I am an idiot, I know almost nothing, I haven't taken calculus, I don't work for NASA, and I am one-quarter Bulgarian sheep dog. With that out of the way, I have several stupid questions..." Alex Wagner.

As this applies to gravitational fields for a fixed source, if the field were static in the first sense, there would be no need of aberration, but also no apparent causality link between source and target. If the field were static in the second sense, then the propagation speed of the entities carrying momentum would give rise to aberration; and the observed absence of aberration demands a propagation speed far greater than light-speed.

So are gravitational fields for a rigid, stationary source frozen, or continually regenerated? Causality seems to require the latter. If such fields are frozen, then what is the mechanism for updating them as the source moves, even linearly? Even a "rigid" bar pushed at one end would not move at the other end until a pressure wave had propagated its entire length. Moreover, we seem to need two mechanisms - one to curve Space-Time when a mass approaches, and another to unbend it when the mass recedes. This is because, once a curve is "frozen" into Space-Time, it will not necessarily "melt" back to its original condition when the cause is removed. Yet, there is no available cause for either process to result from a field with no moving parts.

We can also deduce the consequences for a source in continual acceleration, such as the Sun in our solar system. The Sun's path around the solar system barycenter induced by planetary perturbations causes excursions of over a million kilometers, and the barycenter is sometimes outside the physical body of the Sun. So the Sun's field must be continually updated at all distances to infinity. Surely, this updating requires the propagation of causal agents from the source. And since the source is continually accelerating, the regeneration of the distant field must likewise be a continuous process, requiring propagation. However, propagation involves delays, and even in the solar system, we have observationally ruled out delays as great as light-speed propagation would produce. For example, the solar eclipse experiment is sensitive to delays in the continual updating of the Earth's field by the Sun as they both affect the Moon, and update speeds of at least 20c are required.

The binary pulsar experiment provides another, more direct demonstration that even changes in gravitational fields must propagate faster than light. Ultimately, GR proposes that such changes appear to act instantaneously in the "near field," but eventually show their true, light-speed-delayed character in the "far field," which is conveniently beyond our present ability to observe. The necessity of this dual behavior is to prevent the logical need for changes to continue to appear to act instantaneously at ever increasing distances, even to infinity.

However, this only prevents certain types of paradoxes from arising. When the subject of "black holes" first comes up in physics classes, a frequently asked question is, "If nothing can escape the event horizon because nothing can propagate faster than light, how does gravity get out of a black hole?" The answer usually provided is that the field around a black hole was frozen into the surrounding Space-Time prior to the collapse of the parent star behind an event horizon, and has remained in that state ever since. By implication, there is no need for continual regeneration of the external field by causal agents from the source.

However, let us suppose we have a binary black hole, with the two collapsed stars in elliptical orbits around one another. Then each field must be continually updated by a changing contribution from the orbiting field of the other. How does each field know what it is supposed to do if it is no longer communication with its source mass hidden behind an event horizon? If the curvature of Space-Time at a point near black hole A becomes zero because black hole B is equally distant, what makes it non-zero again once black hole B recedes?

Indeed, if each source mass is forced to accelerate, why should each field point with a certain curvature undergo exactly the same acceleration as the source, making the whole field (to infinity?) appear frozen rigidly to the parent black hole? Perturbations by the other star are different at every different field point, so each such Space-Time field point should experience a different acceleration. With no communication, how can the whole system remain intact and coherent?

We conclude that the concept of frozen gravitational fields is acausal and paradoxical. Gravitational fields must continually regenerate, like a flowing waterfall. In doing so, they must consist of entities that propagate. And the speed of propagation of those entities must greatly exceed the speed of light.

Conclusion: The speed of gravity is > 2x1010 c

We conclude that gravitational fields, even "static" ones, continually regenerate through entities that must propagate at some very high speed, vf. We call this the speed of gravity. Equation 1 then tells us how orbits will expand in response to this large but finite propagation speed, since the field itself, and not merely changes in the field, will transfer momentum to orbiting target bodies. Rewriting Equation 1 in a form suitable for comparisons with observations, we derive:

Consistency with Special Relativity

Einstein special relativity (SR) is able to prove based on its premises that nothing can propagate faster than the speed of light in forward time. Is our result for the speed of gravity an experimental falsification of SR? The correct answer must be a qualified "yes and no." Strictly, the minor new interpretation of SR needed for consistency with our result is no more a falsification of SR than GR was a falsification of Newtonian gravity. In both cases, the earlier theory was incomplete rather than wrong. We will now examine exactly what must change about SR for full consistency with all existing experimental evidence and this new result as well.

A brief overview of the history of relativity will provide useful background for this section, since everything proposed here has been proposed before. The "principle of relativity," that the

laws of physics should be the same as viewed from any inertial frame, dates to the l9th century, well before it was popularized by H. Poincare. The well known "Lorentz transformations" embody that principle, but were not original when Lorentz adopted them for his own theory of relativity, first published in 1904 in an "aether" context. Einstein's main contribution with his famous 1905 paper, then, was the addition of a second postulate, that the speed of light will be locally the same for all observers regardless of their own state of motion. This did away with the need for an aether, or more generally, with a preferred frame of reference.

The ensuing years saw much discussion of whether nature was more like Einstein's SR or Lorentzian Relativity (LR). The experiments relevant to testing relativity are listed in Table II. The discovery of Fresnel drag had seemed at first to demand the existence of an aether, but relativists eventually found ways to explain it using SR too. The Airy water-filled telescope experiment showed that the aberration of starlight was unchanged by passing through a water medium even though that medium slowed the speed of light by about 30%. This too seemed to favor the existence of a preferred frame because the local speed of light did not affect aberration, showing that aberration was determined outside the telescope rather than by the conditions most local to the observer. However, Einstein supporters could also explain this result using SR, albeit with somewhat more complexity.

The Michelson-Morley experiment is the first (and only) observation that seemed to strongly favor SR over LR, although Michelson himself never accepted that. The expected aether drift speed did not put in an appearance in the test results, and the speed of light did indeed seem to be the same in all directions, as SR postulated, even though the observer was obviously moving at high speed in some direction through space. It was not until the last decade that serious consideration was given to the possibility that the local gravity field may always constitute a preferred frame. This idea was popularized in (Beckmann, 1987) and then widely discussed in the journals Galilean Electrodynamics msx2.pha.jhu.edu/~dring/gehtmls/gehome.html and Apeiron redshift.vif.corn/default.htm, and occasionally in the Meta Research Bulletin www.metaresearch.org.

It is now well-established that LR is fully compatible with the Michelson-Morley experiment, and in general with the expectation that the speed of light will seem to be the same even when the observer is moving provided that certain conditions are met, although not under all circumstances. That the speed of light is independent of the speed of its source is unremarkable, since that is a property of all wave motion. However, being independent of the speed of the observer is special. Choosing to synchronize clocks using the Einstein convention automatically makes one-way speed of light independent of the speed of the observer because that assumption is built into the Einstein synchronization method. If some other convention were used to synchronize clocks, such as synchronizing them to an underlying common inertial frame (as is done for the Global Positioning System satellites, or when astronomers synchronize phenomena to a barycentric frame using time provided by distant pulsars), then the one-way speed of light would be different in each direction when measured by observers moving with respect to that special frame. The round-trip speed of light uses a single clock to measure elapsed time, and so does not depend on synchronization. But if the rate of an ordinary clock is affected by its speed in a Lorentzian way, which we now know to be the case, then the measured speed of light will appear to be an invariant in all directions. Using a clock whose rate is not affected by its

translational speed' for example pulses in the strength of the gravitational field from a compact, massive binary star, would apparently allow the speed of the observer relative to the local mean gravity field to be detected.

Following the publication of Einstein's SR paper, two new experimental results were published in 1913, both favoring LR over SR. Indeed, Sagnac claimed a falsification of SR on the grounds that the local speed of light was affected by observer velocity if the observer was attached to a rotating platform. He showed that the Michelson-Morley experiment performed in such a rotating frame did show fringe shifts, and concluded that, even if linear motion was relative, rotational motion was absolute. DeSitter noted that stellar aberration was the same for both components of distant binary stars, even though the relative velocity of each with respect to the observer was quite different. Therefore velocity in some special frame (we might now say velocity in the local gravity field relative to the distant gravity field) rather than relative velocity between source and observer determines aberration. Both of these experiments were blows to SR's contention that all motion was relative. Nonetheless, SR supporters came up with explanations of these phenomena too in an SR context, and these fairly non-trivial explanations are the subjects of textbooks on relativity today.

The Michelson-Gale experiment of 1925 involving the same Michelson as in the Michelson-Morley experiment again claimed a contradiction of SR - a theory that Michelson never found acceptable. History has concluded that this experiment is essentially another demonstration of the Sagnac effect, and no longer cites it as a significant independent experiment; so it is omitted from our table. Ives and Stilwell (1938) drew conclusion similar to those of Michelson, and specifically argued that their own experiment confirmed LR (which they called the Larmor-Lorentz theory) over SR. Yet today, it is simply added to the list of SR confirming experiments.

When the muon lifetime experiments were performed in the 1960s, LR had been all but forgotten. Questions were raised briefly about whether the situation was reciprocal - whether high-speed muons would really see laboratory muons live longer. SR offered assurance that they would, but no test was then possible. By the time the Hafele-Keating experiment compared traveling atomic clocks sent around the world in opposite directions with a stay-at-home clock, an experiment later improved upon by C.O. Alley at the University of Maryland, it was no longer considered remarkable that the velocity effects on clocks had to be based on speeds in the underlying inertial frame instead of the relative velocities of the clocks.

Finally, the Global Positioning System (GPS) showed the remarkable fact that all atomic clocks on board orbiting satellites moving at high speeds in different directions could be simultaneously and continuously synchronized with each other and with all ground clocks. No "relativity of simultaneity" corrections, as required by SR, were needed. This too seemed initially to falsify SR. But on further inspection, continually changing synchronization corrections for each clock exist such that the predictions of SR are fulfilled for any local co-moving frame. To avoid the embarrassment of that complexity, GPS analysis is now done exclusively in the Earth-centered inertial frame (the local gravity field). And the pre-launch adjustment of clock rates to compensate for relativistic effects then hides the fact that all orbiting satellite clocks would be seen to tick slower than ground clocks if not rate-compensated

for their orbital motion, and that no reciprocity would exist when satellites view ground clocks.

Why then did SR win out over LR? Thee circumstances conspired to make SR appear to be the better solution to describing nature in the early years of the 20th century.

Classical thinking about the aether almost always involved a universal field rather than a local field. No one took seriously that each local gravity field might serve as a preferred frame for local observers. Yet that now seems the case.

The wave nature of matter had not yet been discovered by deBroglie. Before that happened, there was no logical reason to expect that clocks based ultimately on atomic oscillations would have their rates affected by observer motion in the same way that the speed of light would be affected by observer motion, rendering observer motion undetectable in experiments. However, that also now seems to be true (Van Flandern, 1993, p.72-77).

The success of GR in predicting the light-bending effect at the 1918 solar eclipse gained great credibility for GR, and SR benefited from this success because it was widely believed that GR was based on SR. But GR is usually implemented using a preferred frame closely coinciding with the local gravity field, with the consequence that only the features that SR and LR have in common were integrated into GR. The reciprocity of time dilation between two inertial frames, a key way in which SR differs from LR, plays no role in GR.

The principal differences between the two relativity theories stem from the equivalence of all inertial frames in SR, and the existence of a preferred frame in LR. Otherwise, SR's time dilation is equivalent to LR's clock slowing; SR's space contraction is equivalent to LR's meter-stick shrinkage; and SR's change in the momentum of moving bodies is equivalent to LR's. However, LR recognizes a "universal time" apart from the time kept by electromagnetic-based clocks affected by motion. And the law of addition of velocities between two frames, neither of which is the preferred frame, is different in LR than in SR. For a derivation of this law and the revised form of the Lorentz transformations for Lorentzian universal time, see Mansouri & Sexl, 1977. For our purposes here, we simply note that the proof that nothing can propagate faster than the speed of light in forward time does not apply to LR.

Near the end of his career, Lorentz is quoted as having graciously conceded the contest: "My theory can obtain all the same results as special relativity, but perhaps not with a comparable simplicity" (private communication from C.O. Alley). Today, with hindsight, we might make a somewhat different assessment: "Special Relativity can explain all the experimental results in Table H that Lorentzian Relativity can, but perhaps not with a comparable simplicity." Even so, SR cannot explain the faster-than-light propagation of gravity, although LR readily can.

We conclude that the speed of gravity may provide the new insight physics has been awaiting to lead the way to unification of the fundamental forces. As shown in Van Flandern, 1993, pp.80-85 and Van Flandern, 1996, it may also be connected with the explanation of the dark matter problem in cosmology. Moreover, the modest switch from SR to LR may correct the "wrong turn" physics must have made to get into the dilemma presented by quantum mechanics, that there appears to be no "deep reality" to the world around us. Quantum phenomena that

violate the locality criterion may now be welcomed into conventional physics.

Acknowledgments

The author is indebted to numerous correspondents who have challenged the conclusions of this paper in so many different ways, especially in USENET discussion groups such as sci.physics, sci.physics.relativity and sci.astro. Each of these challenges has forced a new and deeper investigation, without all of which the present paper could never have hoped to pass peer review. One relativist in particular, Steve Carlip of UC Davis, had the patience to stay with this issue over a span of several years, defending the GR interpretation to the fullest extent possible. Between us we have written enough prose, created enough analogies, pondered enough equations, and consulted enough references to fill a book.

The author further thanks Jeffery Kooistra for his key role. His Analog article, Kooistra, 1997, flushed this subject to the forefront once again, and his inquiries to both Steve Carlip and to the author forced us to explain our positions in layman's language, and thereby diverted us from talking past one another. Discussions with colleagues too numerous to mention must likewise be acknowledged. But Jean-Pierre Vigier, in addition to several penetrating questions, encouraged the author to stop talking and start writing, promising a fair peer review process at the conclusion. Without such encouragement, this paper would certainly not have come into existence.

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January 22, 1998

Index and Direct Links to the Other Web Pages on this Website:

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History of My Research and Development of the Nuclear Gravitation Field Theory

"The Zeta Reticuli Incident" by Terence Dickinson

Supporting Information for the Nuclear Gravitation Field Theory

Government Scientist Goes Public

"Sport Model" Flying Disc Archway

Design and Operation of the "Sport Model" Flying Disc Anti-Matter Reactor

Element 115

United States Patent Number 3,626,605: "Method and Apparatus for Generating a Secondary Gravitational Force Field"

United States Patent Number 3,626,606: "Method and Apparatus for Generating a Dynamic Force Field"

The Physics of Star Trek and Subspace Communication: Science Fiction or Science Fact?

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http://home.comcast.net/~xtxinc/Response.htm

A RESPONSE TO JOHN STACHEL'S PERSONAL ATTACK

In the April, 2003, issue of *Physics World*, John Stachel, one of the early editors of Einstein's *Collected Papers*, published what he styled as a "review" of my book *Albert Einstein: The Incorrigible Plagiarist*. The so-called "review" opens with a personal attack against me stated in particularly meanspirited terms in an alleged effort to justify the otherwise sacrilegious "review" of a book that dares to accurately and thoroughly document the history of the theory of relativity. No mention is made of the facts and circumstances which precipitated the production and publication of this *ad hominem* attack against me, and I can only imagine that an innocent reader who happens upon Dr. Stachel's statements will find them bizarre and inexplicable.

The truth of the matter is that John Stachel coauthored an article "Belated Decision in the Hilbert-Einstein Priority Dispute" in the journal *Science*, Volume 278, (14 November 1997), pp. 1270-1273, which rewrote the history of David Hilbert's well established priority for the generally covariant field equations of gravitation. The claims made in this article relied largely upon a set of printer's proofs dated 6 December 1915 of Hilbert's famous 20 November 1915 Goettingen lecture "The Foundations of Physics". Stachel claimed that David Hilbert's proofs did not contain generally covariant field equations of gravitation, though the final paper eventually published in 1916 on this lecture did contain generally covariant field equations of gravitation--the implication being that David Hilbert learned the equations from Einstein's 25 November 1915 lecture. However, Stachel did not inform his readers of a material fact in his sensationalistic article. Hilbert's proofs were mutilated at some point in their history, and a critical part of the proofs has gone missing. No one knows when the proofs were altered, or why. Prof. Friedwardt Winterberg of the University of Nevada, Reno, informed me of these facts in the late summer of 2002.

Prof. Winterberg has demonstrated that even in their mutilated state these printer's proofs show that Hilbert had the generally covariant field equations of gravitation, before Einstein. This constitutes positive

proof of Einstein's plagiarism, because we have a letter from Einstein to Hilbert dated 18 November 1915 in which Einstein acknowledges receipt of a copy of Hilbert's manuscript, which Einstein had requested from Hilbert on 15 November 1915. The chronology is straightforward. Einstein received a copy of Hilbert's work on 18 November 1915. Hilbert delivered his lecture to the Goettingen Academy on 20 November 1915. Einstein betrayed Hilbert's trust and plagiarized Hilbert's work on 25 November 1915.

I wrote to Dr. Stachel in September of 2002, informed him that I intended to publish on this subject and asked him to state for the record why he did not mention the mutilation of Hilbert's proofs in his article in *Science*. A brief correspondence ensued, with Dr. Stachel behaving very much as he did in his subsequent "review."

Dr. Stachel's avowed reasoning for not mentioning the mutilation of the proofs was, *inter alia*, that the article was an incomplete and preliminary report. I observed that his explanation seemed to conflict with the title and tone of his article in *Science*, which was dubbed a "Belated Decision". I failed to find a statement in Stachel's report that it was incomplete and preliminary, and found that since this was the case, it was all the more reason to mention the fact that the evidence was mutilated, so that those reading the article could arrive at an informed opinion of its claims, and test them against the facts in the full light of day.

Stachel had tried to change the subject to a review of my book he said he intended to write sometime in the future. I ignored his queries in this line and he presented me with an ultimatum that if I did not answer his questions he would consider the "discussion at an end." I refused to allow him to change the subject, and so ended our brief correspondence. Apparently, Dr. Stachel did not deem it necessary to inform his readers of these facts and circumstances, which preceded his nasty "review" of my book in *Physics World*.

Dr. Stachel calls attention to the fact that in my book I quoted portions of Wolfgang Pauli's factual statements of the objective priority of Lorentz and Poincare over Einstein, but quoted only some of Pauli's apparently insincere praise of Einstein--fully informing my readers that such praise follows in Pauli's article for the *Encyklopaedie der mathematischen Wissenschaften*. Though I find Dr. Stachel's dwelling on this nonissue petty and a distraction from the real issues of Einstein's plagiarism, which Stachel conspicuously avoids throughout his undignified rant, he seeks to attack my credibility, and I am, therefore, compelled to respond to his poorly thought out remarks.

Dr. Stachel refers to a letter from Felix Klein to Wolfgang Pauli, a transcription of which appears in *Wissenschaftlicher Briefwechsel mit Bohr, Einstein, Heisenberg, u.a. = Scientific correspondence with Bohr, Einstein, Heisenberg, a.o.*, Springer, New York, (1979), pp. 27-28. It appears to Dr. Stachel that there is a mutual exclusion between Klein's directive to Pauli in this letter, that he should credit Poincare with Poincare's innovations, and my contentions that it appears that Pauli felt forced, or compelled, to praise Einstein with evidently insincere comments after proving that Poincare and Lorentz had created the special theory of relativity before Einstein.

No such mutual exclusion exits. The factual disclosure that Poincare and Lorentz hold priority for the special theory of relativity rather requires that Pauli's statements of praise of Einstein be insincere, and indeed Pauli qualifies his statements, "in a way," which fact Dr. Stachel avoids addressing. All the elements of pressure and submission exist in Klein's letter, and one should bear in mind the stature of Felix Klein--then the world's leading expert on non-Euclidean geometry and one of the greatest of the great minds responsible for the reputation of the Goettingen Academy as a world leader in mathematics. In his letter, Klein directs Pauli as an authority, informs Pauli of his like for Einstein and Einstein's peculiar remarks, and makes clear to Pauli that he wants Einstein praised, albeit with the leftovers from Poincare. Wolfgang Pauli was quite young at the time and Felix Klein's attitude towards Einstein must have served as a source of pressure on Pauli to praise Einstein, even after proving that Einstein did not originate the major concepts of the special theory of relativity. However, Felix Klein's attitude is but one factor. Einstein had recently emerged as an international celebrity, and this, too, must have served as a source of enormous pressure on Pauli to praise Einstein. But these are many words wasted on a nonissue. If Pauli was as sincere in his praise of Einstein as sincere can be, it would not change his arguments that Lorentz and Poincare created the special theory of relativity, before Einstein--which subject Stachel avoids. John Stachel has apparently lost sight of the fact that I am not the issue, rather the history is the issue.

Far more interesting than Klein's directives to Pauli, is Klein's statement that Poincare, who stated before Einstein that the Lorentz transformations form a group, felt an animosity towards Einstein and that this was the sole reason why Poincare did not mention Einstein in his Goettingen lecture "The New Mechanics". Similar comments are found in the writings of Stjepan Mohorovicic, who pointed out that Einstein repeated (without an attribution) Poincare's method of synchronizing clocks with light signals, and, as a result, Poincare did

not mention Einstein in the context of relativity (*See: Die Einsteinsche Relativitaetstheorie und ihr mathematischer, physikalischer und philosophischer Charakter*, Walter de Gruyter & Co., Berlin, Leipzig, (1923), pp. 23-24, 30).

Dr. Stachel has tried to manufacture contradictions in my work which do not exist and has wondered off into odd lists of what he incorrectly believes I did and did not cite, and he is so vague and timid in his remarks, that I would be required to state the implications of his remarks in order to thoroughly contest them, and in so doing run the risk of being accused of misrepresenting him. I will instead leave it to my intelligent readers to understand that Dr. Stachel's comments are so petty, inappropriate and insulting as to not merit further consideration.

However, it is noteworthy that in his long "review" Dr. Stachel nowhere mentions the fact that Einstein had an international reputation as a plagiarist throughout his career, and that his plagiarism was widely discussed in such reputable sources as the *New York Times*, and in the scientific literature around the world. Nor does Dr. Stachel refer to the fact that the original 1905 paper on the principle of relativity was signed "Einstein-Marity", or the fact that the theory of relativity was known as the "Lorentz-Einstein" theory from 1905 through the 1920's. There was apparently no room in Dr. Stachel's "review" for mention of the fact that the Einsteins' 1905 paper on the principle of relativity did not contain any references, though it was largely unoriginal; nor did Einstein's 1915 paper on the field equations of gravitation contain a single reference to the work of others, and it was clearly plagiarized from David Hilbert and Marcel Grossmann. Einstein clearly plagiarized the Lorentz transformation; as well as Poincare's principle of relativity, and his concept of, and exposition on, relative simultaneity; and Einstein failed to acknowledge that Poincare was the first to introduce the four-dimensional concept of space-time into the theory of relativity. Einstein's 1915 formula for the perihelion motion of Mercury is identical to the formula Paul Gerber published in 1898, as even Einstein's closest friends noted, with Einstein, under enormous pressure, eventually grudgingly acknowledging the fact in 1920. Einstein's 1911 prediction for the deflection of a light ray around the sun is nothing but a repetition of the Newtonian prediction made in the 1700's, as Einstein acknowledged in his private correspondence in 1913; and Einstein's revised 1915 prediction comes remarkably close to duplicating the prediction Johann Georg von Soldner made in 1801. Dr. Stachel completely avoided addressing any of the legitimate reasons for the numerous accusations of plagiarism and anticipation, which have been made against Einstein's work from 1905 onward. His silence on these issues speaks loudly.

I share Dr. Stachel's concern for the abuse Mileva Maric suffered, with the difference between us being that I properly attribute that abuse, perhaps even physical abuse, to its source, Albert Einstein. I could quote some of Einstein's hateful and misogynist diatribes, or offer up the evidence of his perverse behavior, his neglect of marital and familial obligations, his smear campaigns against Mileva Maric, but since I have already addressed these issues and since Dr. Stachel avows that he, like me, is genuinely concerned for her, I will leave it to him to expound upon these important issues. Strange though, Stachel found no room in his article for citation of my praise for Mileva Maric, and my arguments in the alternative. It would be nice, and it would be appropriate, if he would leave me as a personality out of the history, and return to that history.

In conclusion, we should all acknowledge the importance of recognizing and recording the facts of the history of the theory of relativity and the history of the "insane publicity" which has promoted and which continues to promote Einstein, virtually to the exclusion of his predecessors. We face a moral imperative to give Einstein's predecessors justice, if only posthumously, and we must acknowledge their legacy. We have an obligation to the science of history to accurately record the past. It was for this purpose of accurately recording the history that I wrote my book. I am quite proud of my Jewish heritage, and if John Stachel wants to change the subject to anti-Semitism, I will join him in condemning it in all its forms, and go about the work of a historian recording the facts surrounding Einstein's career of plagiarism, even if it means enduring Dr. Stachel's petty insults. I do not think that alarmist slogans and attempts to render the subject taboo have any place in a scholarly exploration of the facts.

Christopher Jon Bjerknes

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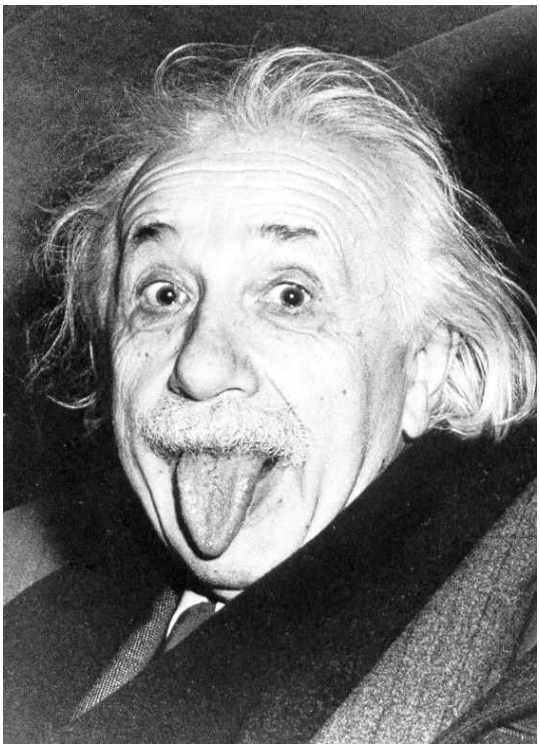

The Einstein Hoax

The joke's on us

"Ein stein" means "one stone", a metaphor for half a brain

"The nation has been on the decline mentally and morally since 1870...Behind the Nazi party stands the German people, who elected Hitler after he had in his book and in his speeches made his shameful intentions clear beyond the possibility of misunderstanding. ... The Germans can be killed or constrained after the war, but they cannot be re-educated to a democratic way of thinking and acting..." Albert Einstein

This "brilliant" jew is, of course, referring to a people who were almost totally destroyed in a world war, have succeeded in ridding themselves of the scourge of jews, and within half a century rebuilt their country to achieve family incomes almost twice as high as ours

BY TOM BETHEL

No one has paid attention yet, but a well-respected physics journal just published an article whose conclusion, if generally accepted, will undermine the foundations of modern physics -- Einstein's Theory of Relativity in particular. Published in Physics Letters A (December 21, 1998), the article claims that the speed with which the force of gravity propagates must be at least twenty billion times faster than the speed of light. This would contradict the Special Theory of Relativity of 1905, which asserts that nothing can go faster than light. This claim about the special status of the speed of light has become part of the world view of educated laymen in the twentieth century.

NOTE: Tom Van Flandern's article, titled "The Speed of Gravity - What the Experiments Say," is provided as a Web Page on this Website.

Special Relativity, as opposed to the General Theory (1916), is considered by experts to be above criticism, because it has been confirmed "over and over again." But several dissident physicists believe that there is a simpler way of looking at the facts, a way that avoids the mind-bending complications of Relativity. Their arguments can be understood by laymen. I wrote about one of these dissidents, Peter Beckmann, over five years ago (TAS, August 1993, and Correspondence, TAS, October 1993). The present article introduces new people and arguments. The subject is important because if Special Relativity is supplanted, much of twentieth-century physics, including quantum theory, will have to be reconsidered in that light.

The article in Physics Letters A was written by Tom Van Flandern, a research associate in the physics department at the University of Maryland. He also publishes Meta Research Bulletin which supports "promising but unpopular alternative ideas in astronomy." In the 1990's, he worked as a special consultant to the Global Positioning System (GPS), a set of satellites whose atomic clocks allow ground observers to determine their position to within about a foot. Van Flandern reports that an intriguing controversy arose before GPS was even launched. Special Relativity gave Einsteinians reason to doubt whether it would work at all. In fact, it works fine (But more on that later).

The publication of his article is a breakthrough of sorts. For years, most editors of mainstream physics journals have automatically rejected articles arguing against Special Relativity. This policy was informally adopted in the wake of the Herbert Dingle controversy. A professor of science at the University of London, Dingle had written a book popularizing Special Relativity, but by the 1960's he had become convinced that it couldn't be true. So he wrote another book, Science at the Crossroads (1972), contradicting the first. Scientific journals, especially Nature, were bombarded with his (and others') letters.

An editor of Physics Letters A promised Van Flandern that reviewers would not be allowed to reject his article simply because it conflicted with received wisdom. Van Flandern begins with the "most amazing thing" he learned as a graduate student of celestial mechanics at Yale: that all gravitational interactions must be taken as instantaneous. At the same time, students were also taught that Einstein's Special Relativity proved that nothing could propagate faster than light in a vacuum. The disagreement "sat there like an irritant," Van Flandern told me. He

determined that one day he would find its resolution. Today, he thinks that a new interpretation of Relativity may be needed.

The argument that gravity must travel faster than light goes like this. If its speed limit is that of light, there must be an appreciable delay in its action. By the time the Sun's "pull" reaches us, the Earth will have "moved on" for another 8.3 minutes (the time of light travel). But by then the Sun's pull on the Earth will not be in the same straight line as the Earth's pull on the Sun. The effect of these misaligned forces "would be to double the Earth's distance from the Sun in 1200 years." Obviously, this is not happening. The stability of planetary orbits tells us that gravity must propagate much faster than light. Accepting this reasoning, Isaac Newton assumed that the force of gravity must be instantaneous.

Astronomical data support this conclusion. We know, for example, that the Earth accelerates toward a point 20 arc-seconds in front of the visible Sun -- that is, toward the true, instantaneous direction of the Sun. Its light comes to us from one direction, its "pull" from a slightly different direction. This implies different propagation speeds for light and gravity.

It might seem strange that something so fundamental to our understanding of physics can still be a matter of debate. But that in itself should encourage us to wonder how much we really know about the physical world. In certain Internet discussion groups, "the most frequently asked question and debated topic is 'What is the speed of gravity?,'" Van Flandern writes. It is heard less often in the classroom, but only "because many teachers and most textbooks head off the question." They understand the argument that it must go very fast indeed, but they also have been trained not to let anything exceed Einstein's speed limit.

So maybe there is something wrong with Special Relativity after all. In The ABC of Relativity (1925), Bertrand Russell said that just as the Copernican system once seemed impossible and now seems obvious, so, one day, Einstein's Relativity theory "will seem easy." But it remains as "difficult" as ever, not because the math is easy or difficult (Special Relativity requires only high-school math, General Relativity really is difficult), but because elementary logic must be abandoned. "Easy Einstein" books remain baffling to almost all. The sun-centered solar system, on the other hand, has all along been easy to grasp.

Nonetheless, Special Relativity (which deals with motion in a straight line) is thought to be beyond reproach. General Relativity (which deals with gravity, and accelerated motion in general) is not regarded with the same awe. Stanford's Francis Everitt, the director of an experimental test of General Relativity due for space-launch next year, has summarized the standing of the two theories in this way: "I would not be at all surprised if Einstein's General Theory of Relativity were to break down," he wrote. "Einstein himself recognized some serious shortcomings in it, and we know on general grounds that it is very difficult to reconcile with other parts of modern physics. With regard to Special Relativity, on the other hand, I would be much more surprised. The experimental foundations do seem to be much more compelling." This is the consensus view.

Dissent from Special Relativity is small and scattered. But it is there, and it is growing. Van Flandern's article is only the latest manifestation. In 1987, Peter Beckmann, who taught at the University of Colorado, published Einstein Plus Two, pointing out that the observations that led

to Relativity can be more simply reinterpreted in a way that preserves universal time. The journal he founded, Galilean Electrodynamics was taken over by Howard Hayden of the University of Connecticut (Physics), and is now edited by Cynthia Kolb Whitney of the Electro-Optics Technology Center at Tufts. Hayden held colloquia on Beckmann's ideas at several New England universities, but could find no physicist who even tried to put up an argument.

A brief note on Einstein's most famous contribution to physics -- the formula that everyone knows. When they hear that heresy is in the air, some people come to the defense of Relativity with this question: "Atom bombs work, don't they?" They reason as follows: The equation E = mc2 was discovered as a byproduct of Einstein's Special Theory of Relativity (True). Relativity, they conclude, is indispensable to our understanding of the way the world works. But that does not follow. Alternative derivations of the famous equation dispense with Relativity. One such was provided by Einstein himself in 1946. And it is simpler than the relativistic rigmarole. But few Einstein books or biographies mention the alternative. They admire complexity, and cling to it.

Consider Clifford M. Will of Washington University, a leading proponent of Relativity today. "It is difficult to imagine life without Special Relativity," he says in Was Einstein Right? "Just think of all the phenomena or features of our world in which Special Relativity plays a role. Atomic energy, both the explosive and the controlled kind. The famous equation E = mc2 tells how mass can be converted into extraordinary amounts of energy." Note the misleading predicate, "plays a role." He knows that the stronger claim, "is indispensable," would be pounced on as inaccurate.

Is there an alternative way of looking at all the facts that supposedly would be orphaned without Relativity? Is there a simpler way? A criterion of simplicity has frequently been used as a court of appeal in deciding between theories. If it is made complex enough, the Ptolemaic system can predict planetary positions correctly. But the Sun-centered system is much simpler, and ultimately we prefer it for that reason.

Tom Van Flandern says the problem is that the Einstein experts who have grown accustomed to "Minkowski diagrams and real relativistic thinking" find the alternative of universal time and "Galilean space" actually more puzzling than their own mathematical ingenuities. Once relativists have been thoroughly trained, he says, it's as difficult for them to rethink the subject in classical terms as it is for laymen to grasp time dilation and space contraction. For laymen, however, and for those physicists who have not specialized in Relativity, which is to say the vast majority of physicists, there's no doubt that the Galilean way is far simpler than the Einsteinian. Special Relativity was first proposed as a way of sidestepping the great difficulty that arose in physics as a result of the Michelson-Morley experiment (1887). Clerk Maxwell had shown that light and radio waves share the same electromagnetic spectrum, differing only in wave length. Sea waves require water, sound waves air, so, it was argued, electromagnetic waves must have their own medium to travel in. It was called the ether. "There can be no doubt that the interplanetary and interstellar spaces are not empty," Maxwell wrote, "but are occupied by a material substance or body, which is certainly the largest, and probably the most uniform body of which we have any knowledge." As today's dissidents see things, it was Maxwell's

assumption of uniformity that was misleading.

The experiment of Michelson and Morley tried to detect this ether. Since the Earth in its orbital motion must plow through it, an "ether wind" should be detectable, just as a breeze can be felt outside the window of a moving car. Despite repeated attempts, however, no ethereal breeze could be felt. A pattern of interference fringes was supposed to shift when Michelson's instrument was rotated. But there was no fringe shift.

Einstein explained this result in radical fashion. There is no need of an ether, he said. And there was no fringe shift because the speed of an approaching light wave is unaffected by the observer's motion. But if the speed of light always remains the same, time itself would have to slow down, and space contract to just the amount needed to ensure that the one divided by the other -- space divided by time -- always gave the same value: the unvarying speed of light. The formula that achieved this result was quite simple, and mathematically everything worked out nicely and agreed with observation.

The skeptical, meanwhile, were placated with this formula: "I know it seems odd that time slows down and space contracts when things move, but don't worry, a measurable effect only occurs at high velocities -- much higher than anything we find in everyday life. So for all practical purposes we can go on thinking in the same old way." (Meanwhile, space and time have been subordinated to velocity. Get used to it.)

Now we come to some modern experimental findings. Today we have very accurate clocks, accurate to a billionth of a second a day. The tiny differentials predicted by Einstein are now measurable. And the interesting thing is this: Experiments have shown that atomic clocks really do slow down when they move, and atomic particles really do live longer. Does this mean that time itself slows down? Or is there a simpler explanation?

The dissident physicists I have mentioned disagree about various things, but they are beginning to unite behind this proposition: There really is an ether, in which electromagnetic waves travel, but it is not the all-encompassing, uniform ether proposed by Maxwell. Instead, it corresponds to the gravitational field that all celestial bodies carry about with them. Close to the surface (of sun, planet, or star) the field, or ether, is relatively more dense. As you move out into space it becomes more attenuated. Beckmann's Einstein Plus Two introduces this hypothesis, I believe for the first time, and he told me it was first suggested to him in the 1950's by one of his graduate students, Jiri Pokorny, at the Institute of Radio Engineering and Electronics in Prague. Pokorny later joined the department of physics at Prague's Charles University, and today is retired.

I believe that all the facts that seem to require special or General Relativity can be more simply explained by assuming an ether that corresponds to the local gravitational field. Michelson found no "ether wind," or fringe shift, because of course the Earth's gravitational field moves forward with the Earth. As for the bending of starlight near the Sun, the confirmation of General Relativity that made Einstein world-famous, it is easily explained given a non-uniform light medium. It is a well known law of physics that wave fronts do change direction when they enter a denser medium. According to Howard Hayden, refracted starlight can be derived this way "with a few lines of high school algebra.? And derived exactly. The tensor calculus and

Riemannian geometry of General Relativity gives only an approximation. Likewise the "Shapiro Time-Delay," observed when radar beams pass close to the Sun and bounce back from Mercury. Some may prefer to try to understand all this in terms of the "curvature of Space-Time," to use the Einstein formulation (unintelligible to laymen, I believe). But they should know that a far simpler alternative exists.

The advance of the perihelion of Mercury's orbit, another famous confirmation of General Relativity, is worth a closer look (the perihelion is the point in the orbit closest to a sun). Graduate theses may one day be written about this peculiar episode in the history of science. In his book, Subtle Is the Lord, Abraham Pais reports that when Einstein saw that his calculations agreed with Mercury's orbit, "he had the feeling that something actually snapped in him ... This experience was, I believe, by far the strongest emotional experience in Einstein's scientific life, perhaps in all his life. Nature had spoken to him."

Fact: The equation that accounted for Mercury's orbit had been published 17 years earlier, before Relativity was invented. The author, Paul Gerber, used the assumption that gravity is not instantaneous, but propagates with the speed of light. After Einstein published his General Relativity derivation, arriving at the same equation, Gerber's article was reprinted in *Annalen der Physik* (the journal that had published Einstein's Relativity papers). The editors felt that Einstein should have acknowledged Gerber's priority. Although Einstein said he had been in the dark, it was pointed out that Gerber's formula had been published in Mach's Science of Mechanics, a book that Einstein was known to have studied. So how did they both arrive at the same formula?

Tom Van Flandern was convinced that Gerber's assumption (gravity propagates with the speed of light) was wrong. So he studied the question. He points out that the formula in question is well known in celestial mechanics. Consequently, it could be used as a "target" for calculations that were intended to arrive at it. He saw that Gerber's method "made no sense, in terms of the principles of celestial mechanics." Einstein had also said (in a 1920 newspaper article) that Gerber's derivation was "wrong through and through."

So how did Einstein get the same formula? Van Flandern went through his calculations, and found to his amazement that they had "three separate contributions to the perihelion; two of which add, and one of which cancels part of the other two; and you wind up with just the right multiplier." So he asked a colleague at the University of Maryland, who as a young man had overlapped with Einstein at Princeton's Institute for Advanced Study, how in his opinion Einstein had arrived at the correct multiplier. This man said it was his impression that, "knowing the answer," Einstein had "jiggered the arguments until they came out with the right value."

If the General Relativity method is correct, it ought to apply everywhere, not just in the solar system. But Van Flandern points to a conflict outside it: binary stars with highly unequal masses. Their orbits behave in ways that the Einstein formula did not predict. "Physicists know about it and shrug their shoulders," Van Flandern says. They say there must be "something peculiar about these stars, such as an oblateness, or tidal effects." Another possibility is that Einstein saw to it that he got the result needed to "explain" Mercury's orbit, but that it doesn't apply elsewhere.

The simplest way to understand all this "without going crazy," Van Flandern says, is to discard Einsteinian Relativity and to assume that "there is a light-carrying medium." When a clock moves through this medium "it takes longer for each electron in the atomic clock to complete its orbit." Therefore, it makes fewer "ticks" in a given time than a stationary clock. Moving clocks slow down, in short, because they are "ploughing through this medium and working more slowly." It's not time that slows down. It's the clocks. All the experiments that supposedly "confirm" Special Relativity do so because all have been conducted in laboratories on the Earth's surface, where every single moving particle, or moving atomic clock, is in fact "ploughing through" the Earth's gravitational field, and therefore slowing down.

Both theories, Einsteinian and local field, would yield the same results. So far. Now let's turn back to the Global Positioning System. At high altitude, where the GPS clocks orbit the Earth, it is known that the clocks run roughly 46,000 nanoseconds (one-billionth of a second) a day faster than at ground level, because the gravitational field is thinner 20,000 kilometers above the Earth. The orbiting clocks also pass through that field at a rate of three kilometers per second -- their orbital speed. For that reason, they tick 7,000 nanoseconds a day slower than stationary clocks.

To offset these two effects, the GPS engineers reset the clock rates, slowing them down before launch by 39,000 nanoseconds a day. They then proceed to tick in orbit at the same rate as ground clocks, and the system "works." Ground observers can indeed pin-point their position to a high degree of precision. In (Einstein) theory, however, it was expected that because the orbiting clocks all move rapidly and with varying speeds relative to any ground observer (who may be anywhere on the Earth's surface), and since in Einstein's theory the relevant speed is always speed relative to the observer, it was expected that continuously varying relativistic corrections would have to be made to clock rates. This in turn would have introduced an unworkable complexity into the GPS. But these corrections were not made. Yet "the system manages to work, even though they use no relativistic corrections after launch," Van Flandern said. "They have basically blown off Einstein."

The latest findings are not in agreement with relativistic expectations. To accommodate these findings, Einsteinians are proving adept at arguing that if you look at things from a different "reference frame," everything still works out fine. But they have to do the equivalent of standing on their heads, and it's not convincing. A simpler theory that accounts for all the facts will sooner or later supplant one that looks increasingly Rube Goldberg-like. I believe that is now beginning to happen.

Dingle's Question:

University of London Professor Herbert Dingle showed why Special Relativity will always conflict with logic, no matter when we first learn it. According to the theory, if two observers are equipped with clocks, and one moves in relation to the other, the moving clock runs slower than the non-moving clock. But the Relativity principle itself (an integral part of the theory) makes the claim that if one thing is moving in a straight line in relation to another, either one is entitled to be regarded as moving. It follows that if there are two clocks, A and B, and one of them is moved, clock A runs slower than B, and clock B runs slower than A. Which is absurd.

Dingle's Question was this: Which clock runs slow? Physicists could not agree on an answer. As the debate raged on, a Canadian physicist wrote to Nature in July 1973: "Maybe the time has come for all of those who want to answer to get together and to come up with one official answer. Otherwise the plain man, when he hears of this matter, may exercise his right to remark that when the experts disagree they cannot all be right, but they can all be wrong."

The problem has not gone away. Alan Lightman of MIT offers an unsatisfactory solution in his Great Ideas in Physics (1992). "The fact that each observer sees the other clock ticking more slowly than his own clock does not lead to a contradiction. A contradiction could arise only if the two clocks could be put back together side by side at two different times." But clocks in constant relative motion in a straight line "can be brought together only once, at the moment they pass." So the theory is protected from its own internal logic by the impossibility of putting it to a test. Can such a theory be said to be scientific? --TB

Tom Van Flandern's Meta Research Bulletin ($15) and his book, Dark Matter, Missing Planets ($24.50), may be obtained from P.O. Box 15186, Chevy Chase, MD 20825; Peter Beckmann's Einstein Plus Two ($40) from Golem Press, P.O. Box 1342, Boulder, CO 80306. Beckmann's book is highly technical; Van Flandern's is mostly accessible to laymen.

Tom Bethell is TAS's Washington correspondent. His new book, The Noblest Triumph, was recently published by St. Martin's Press.

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History of My Research and Development of the Nuclear Gravitation Field Theory

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Supporting Information for the Nuclear Gravitation Field Theory

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United States Patent Number 3,626,605: "Method and Apparatus for Generating a Secondary Gravitational Force Field"

United States Patent Number 3,626,606: "Method and Apparatus for Generating a Dynamic Force Field"

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"The Einstein Hoax"

"The Einstein Hoax" is intended for those who have been suspicious of the premise that reality is so subtle that it can only be understood in terms of sophisticated abstract mathematics to which only the elite were privy. The understanding of reality in concrete terms was presented as being beyond the capability of intelligent individuals. Instead, reality turns out to be readily understandable in terms of common sense reasoning once the smoke and mirrors of mathematical obfuscation and the mathematical and logical errors associated with Special and General Relativity have been removed. All that is required in reading this text is a good understanding of undergraduate level physics and a passing familiarity with the meaning of elementary calculus. The Alice in Wonderland reality of Black Holes, Singularities, Wormholes, Superstrings, etc. vanishes and, by reverse engineering, the nature, construction, origin and fate of our Universe becomes rather obvious. (As the cycles and epicycles of pre-Copernican astronomical theory demonstrate, General Relativity and the Superstring concept show that any theory can be made to agree with observation if one adds enough superfluous degrees of freedom).

In attempting to understand the phenomena associated with Spexial and General Relativity one must of necessity rely upon information provided by experts and make a judgement as to whether the experts are providing valid information. Over a lifetime of integrating the work of high techology experts into useful product designs, the writer has recognized that a reliable means of evaluating their expertise exists, to wit:-

A:- Over time, the expert will ocassionally discuss some of item of information of which the listener's expertise overlaps that of the expert. If the expert has the subject wrong, he is not an espert, he is a charlatan pretending to be an expert.

B:- When someone is expert in a field, he will be able to adequately explain the workings of his field in terms which are understandable to an intelligent layman. There is only one possible reason why he would be unable to do so, he doesn't actually understand his field. When one corrects two minor errors which still exist in the mathematics of Special Relativity, as is done rigorously in "Corrections to Special Relativity" and derives the properties of the gravitational field in a rigorous manner, as is done in "Gravity", all sorts of wonderful and completely unexpected results are obtained in terms which are completely consistent with common sense. These results include the location of kinetic energy, the nature of mass, the reason for the relativistic effects of velocity, the source of gravitational energy, the mechanics of the apparent

"Big Bang" origin of the Universe and its subsequent expansion, and even the nature of matter and the source of the forces between particles. The likelihood of the results which are provided being wrong are vanishingly small. Unlike the mathematical reasoning typically used by theoretical physicists, which has the unfortunate characteristic that the probability of error increases with the number of steps, the probability of error when common sense methods are applied in a disciplined and self consistent manner decreases as the number of steps and factors involved increases. It is impossible to complete a jigsaw puzzle incorrectly.

In your reading of the material presented, the author asks you not to take his word or the word of anyone else for anything. Instead, he asks that you check the material presented with your own knowledge, intelligence, and common sense. The only background required is an understanding of College Level Freshman Physics and a familiarity with the principles of Elementary Calculus. Please do not accept the fiction that the subject matter can only be understood by highly educated individuals in terms of abstract mathematics. When an expert cannot make himself understood by an intelligent and motivated layman, it invariably means that the expert does not understand his subject! The author hopes that the material presented passes this test. He can only guarantee, however, that he has done his homework and that the material presented has been developed with extreme care.

Summary of "The Einstein Hoax"

Chapter Titles

1.- Introduction
2.- Historical Background
3.- The Nature of the Einstein Hoax
4.- Does the Aether Exist?
5.- The Resurrection of Absolute Velocity by Quantum Experiments
6.- The Nature of Reality
7.- Applying the Lorentz Transformations Properly
8.- Generating the Gravity Transformations
9.- Dr. Einstein's Error and the Introduction of Curved Space
10.- Gravitational Contraction and Collapse
11.- Gravitational Collapse and the Creation of a Universe
12.- The Space Time Continuum
13.- The Nature of Particles
14.- Adding Quantum Effects to Our Understanding
15.- Changing the Paradigms
16.- What Can We Conclude?

There are 57,000 words and 53 illustrations.

Summary:-

In the 19th Century, it was considered axiomatic that all of Nature was the result of the action of various mechanisms, mechanical, electromagnetic, and perhaps others which were yet to be recognized. Lord Raleigh was reported to have asserted that there was no phenomena in Nature

for which a model could not be built. It was considered the physicists job to employ an iterative process which consisted of constructing that model, analyzing its behavior using appropriate mathematical techniques, and verifying the validity of the model and the mathematics by experimentation. Under that philosophy, 19th century physicists had concluded that light was a transverse vibration propagating through a rigid medium named the Aether. However, when attempts were made to measure the effect on the observed velocity of light resulting from the variation in the velocity of the Earth in its orbit, the experiments yielded a null result.

By 1903, the recognition by Fitzgerald that matter contracts in the direction of the velocity vector, the recognition by Larmor that clocks ran slower as a result of velocity, and the derivation by Lorentz of the Lorentz Contraction for Mass (based on Thomson's derivation of E=MC^2 in 1888), led to the Lorentz Contraction-Aether (Aether Relativity) Theory. This theory resolved the dilemma. It demonstrated that all attempts to measure our velocity with respect to the Aether by conventional means would yield a null result. The reasons for the null result became intuitively understandable once quantum physicists had demonstrated that the forces between particles were electromagnetic in nature. At the time, the only apparent weakness of Aether Relativity was that it did not explain the effects of velocity on electric and magnetic phenomena. When 19th Century Dimensional Analysis is used to derive Lorentz Transformations for those effects, the apparent defect in the Aether Theory disappears, and it is found to satisfy the criteria demanded by 19th Century science.

Two years later, in 1905, an obscure patent clerk possessing a Ph.D. in physics, apparently sensing an opportunity represented by the then apparent inability of the Aether Relativity Theory to explain electromagnetic phenomena, published the Special Theory of Relativity. In deriving this theory he applied mathematical techniques to Poincare's Principle of Relativity. Upon examination, Special Relativity is found to be identical to the Aether Relativity Theory with the conceptual restraint imposed by a preferred velocity reference frame (the Aether) removed. Since, under both theories, an observer could not measure his velocity with respect to that preferred reference frame by techniques known at the time, the academic community asserted that the concept of the Aether was meaningless. They then took the unscientific step of demanding that the Aether concept was not to be used as a basis for further work in the physical sciences even though its usage could produce no adverse effect. (To his credit, Dr. Einstein warned that it had not been proven that the Aether didn't exist, it had only been proven that it wasn't needed in physical theories.) It should be noted that, unlike the Aether Relativity Theory, Special Relativity Theory did not resolve the alleged electromagnetic limitations of the Aether Relativity Theory, it arbitrarily defined them as non-existent!

While the Aether Relativity Theory was consistent with common sense and allowed Lord Raleigh's model to be constructed, the resulting interpretations of the Special Theory of Relativity contradicted that common sense and made it impossible to construct an equivalent model. To individuals with a strong sense of reality, Special Relativity lead to unanswerable questions. (e.g.- If light consists of particles traveling ballistically through empty space rather than vibrations traveling though a medium [the Aether], how does it manage to maintain a velocity which is independent of the velocity of its source without relying upon some form of magic?- Chapter 4). Instead of recognizing such questions as problems inherent in Special Relativity, relativists responded with assertions that they were indicative of the brilliance of Dr.

Einstein's work and the questioner should not feel bad about them because there were only a few minds in the world capable of understanding that work. This was probably true, but not because of Dr. Einstein's brilliance, it was because Special Relativity only worked if one avoided asking embarrassing questions. Over the years, if any student working towards an advanced degree in physics persisted in asking the questions asked in Chapter 4, he would have been dismissed as not having the mental capacity to understand the subject matter. Recently, however, the situation has changed. High altitude observations of the radiation background of space have shown that an absolute velocity reference (the Aether) must exist. Furthermore, experiments in quantum physics have shown how our velocity with respect to that velocity reference could be measured. The fact that such measurements are possible demonstrates that Special Relativity's interpretation of reality is deficient. The Aether Relativity Theory, on the other hand, provides the same mathematical predictions as Special Relativity in a manner which is consistent with the requirements of a Raleigh type of model.

Since Aether Relativity was provided two years before Special Relativity, one must ask the question as to why Dr. Einstein's work was considered to be more than a refinement of existing theory rather than a profound new insight. The answer would seem to lie in the political goals of the scientific community. Dr. Einstein achieved his results through a mathematical derivation rather than through the physical insight employed by Fitzgerald. Mathematics has a property not possessed by insightful reasoning. Mathematics can be taught by rote and, since almost anyone can learn by rote without actually having to understand the subject matter, the cadre of physical scientists could be readily expanded. It appeared that progress could be made by combining mathematics with experiment without the need for generating a conceptual model of the phenomena under study. It became vital, therefore to suppress the Aether Relativity concept so that the fiction that the combination of mathematics and experiment were sufficient to achieve progress could be established and maintained.

Spurred on by his success with Special Relativity, Dr. Einstein went on to derive General Relativity by combining the Principle of Equivalence (between inertial and gravitational masses) and the Principle of Relativity. Without the inherent safety net which would have been provided by the inclusion of a Raleigh type of model, Dr. Einstein's failed to recognize that the physical significance of the relativity phenomena prohibited the use of Tensor Calculus for such a purpose and used that technique to derive his new theory. He struggled for about 18 months before revising his approach. Instead of eliminating the mathematical error implicit in his use of Tensor Calculus, he added another degree of freedom by using the incomplete geometry of Riemann and allowing space to be curved. (This geometry lacks the requirement that parallel lines never meet and as such is a subset of conventional Euclidian geometry. A typical example is the two dimensional non-Euclidian geometry of the surface of the three dimensional Earth.) There was enough truth in his results to allow him to predict the effects of the Sun's field on the precession of Mercury's orbit, the bending of the path of light, and the slowing of clocks. The observations which supposedly verified General Relativity were, and still are, about a million times too crude to reveal its residual errors. As a gravitational theory, General Relativity is a failure. It cannot account for the force which holds you to your chair or the energy which gravity will apply to you if you fall. (If one falls out of a window, he couldn't care less about the precession of Mercury's orbit, he cares about the results of the force of gravity.) Even though

Dr. Einstein was reported to have been uneasy about the extension of General Relativity to extremely strong fields, that extension has been made to include gravitational collapse and has led to the concepts of Black Holes, Singularities, Wormholes, etc. The existence of these conclusions should have caused a reexamination of the basic theory instead of blind acceptance.

"The Einstein Hoax" does not require the possession of advanced degrees for its understanding. Freshman (or even high school) physics and an understanding of the nature of elementary calculus (skill is not needed) is all that is required. The text removes the mystery behind Special Relativity by demonstrating the how and why of the effects involved and shows that experiments already conducted by quantum physicists have proven not only that the Aether is real but that our absolute velocity through space is readily measurable. It is Aether Relativity which represents reality. The text then continues and develops gravitational transformations equivalent to the Lorentz Transformations which allow the reader to visualize what the gravitational field is all about; the source of its energy; a demonstration that the idea of curved space is merely an artifice introduced by Dr. Einstein's to partially overcome his error in using Tensor Calculus; and the source of the pressure which causes the gravitational collapse of an object to cease before it becomes a Black Hole. As an unexpected bonus, these gravitational transformations show how our Universe was created; lead to the observed cosmology; show that the expansion of our Universe will continue forever; and demonstrate that every object which undergoes gravitational collapse eventually becomes another universe as rich as our own. The nature of space and time is discussed followed by a description of the nature of matter and the manner in which Planck's Constant insures that the three quarks which constitute a nucleon are fundamental and contain no smaller structure. (The zoo of high energy particles created by particle accelerator experiments are temporary products produced by the kinetic energy of the collision and quickly decay into normal matter and energy. Other than providing an insight into the nature of the Aether, the author suspects they have no significance.) The previously written texts, "Gravity" and "Corrections to Special Relativty", are rigorous derivations of the material presented in "The Einstein Hoax" are presented as a backup. As is the case with "The Einstein Hoax", these texts are written for those having an undergraduate understanding of Physics and Elementary Calculus, but their rigor does require more patience.

The author accepts the possibility that the concepts presented may be wrong, however he finds it extremely difficult to accept that they are as defective as the concepts which are presently held. The material presented not only passes the tests of experiment and mathematical verification, it passes the test of Lord Raleigh that it is in accordance with a single self-consistent model. The fact that the material presented passes the Raleigh test provides the author with a great deal of confidence. Unlike a mathematical solution in which the probability of error increases with the number of steps, the probability of error in a Raleigh Model decreases with its complexity. REMEMBER, IT IS IMPOSSIBLE TO COMPLETE A JIGSAW PUZZLE INCORRECTLY.

The Website contains two additional texts, "Gravity", which provides a rigorous derivation of the properties of the gravitational field, and "Corrections to Residual Errors in Special Relativity"

III:- Summary of "Gravity"

Chapter Titles

1:- Introduction
2:- Laying the Groundwork
3:- Evaluating the Gravitational Conversion Factors
4:- Comparison with the "Real World"
5:- The Complete Gravitational Field

There are 50,000 words and 22 diagrams.

Being dissatisfied with the published treatments of the gravitational phenomena and recognizing that gravity was a relativistic phenomena, the author began decades ago to study the subject carefully. It seemed obvious to him that the phenomena described by the Lorentz Transformations of Special Relativity and the time dilation of General Relativity described effects in which the measuring instruments by which observations were being made were probably being altered by the phenomena being investigated. To deal with this possibility and determine what was actually occurring (as would be observed by "godlike" instruments which were unchanged), the author elected to use the techniques of Dimensional Analysis.

Investigation of the treatment of gravitation provided by General Relativity reveals several basic defects:-

1:- The time dilation expression it provides is not multiplicatively commutative and therefore is in conflict with one of its basic postulates, the Principle of Relativity. As a result, the predictions made by General Relativity must be grossly in error in strong fields such as exist around neutron stars. This error is undetectable within the extremely weak field of the Solar System. As currently stated, the time dilation expression for the gravitational field would cause the laws of physics to change as a function of elevation.

2:- The curved space predicted by General Relativity would allow a perpetual motion machine of the first kind to be constructed in principle.

3:- General Relativity leads to a singularity at its end limit.

4:- General Relativity fails to account for the energy of fall and concludes that the gravitational field is able to 'create' energy.

5:- General Relativity leads to conclusions which are in conflict with its other basic postulate, the Principle of Equivalence.

These deficiencies do not result from a failure of the Principles of Relativity and of Equivalence in combination. They result from a misapplication both of the Principle of Equivalence and of the Tensor Calculus used in the derivation of General Relativity. When the misapplication of the Principle of Equivalence is corrected and the use of Tensor Calculus is avoided, the combination of the Principle of Equivalence and the Principle of Relativity is found to yield the same results as derived in the approach taken in this discussion.

By combining the Principle of Relativity with Dimensional Analysis, a treatment of the gravitational field has been developed which is both internally consistent and which is

consistent with the results of all observations and with all currently accepted 'physical laws'. Unlike General Relativity, the concepts presented meet the following criteria:

1:- Consistent with all accepted physical laws. 2:- Consistent with all observations. 3:- All dilations are multiplicatively commutative in agreement with the Principle of Relativity. 4:- Source of gravitational energy is revealed, an obvious failure of General Relativity.. 5:- Energy is conserved in the absolute sense, another obvious failure of General Relativity. 6:- Gravitational collapse is self limiting. 7:- Conclusions suggest observed cosmology. 8:- Conclusions are compatible with both the Principle of Relativity and the Principle of Equivalence.

Summary of "Corrections to Special Relativity"

Section Titles

1:- Introduction.
2:- Section 2 - Groundwork of Discussion.
3:- A Comparison of the Velocity Difference Between Velocity Reference Frames 'B' and 'C' as Observed in Reference Frame 'B' and as Observed in Reference Frame 'A'.
4:- Determination of the Lorentz Transformation for Incremental Mass and for Force Between Reference Frames Having Relative Velocity.
5:- The Balance of Moments Applied to a Right Angle Lever in Velocity Reference Frame 'B' Moving with Velocity, V, with Respect to Velocity Reference Frame 'A' as Observed in Reverence Frames 'A' and 'B'.
6:- The Conventional and Revised Lorentz Transformations for Transverse Force as Related to the Right Angle Lever Thought Experiment.
7:- The Lorentz Transformation for Parallel and Transverse force as Related to a Compressed Spring Thought Experiment.

This paper derives the Lorentz Transformations for force parallel to and transverse to the relative velocity vector between velocity reference frames. In the process it demonstrates that both the accepted Lorentz Transformation for Force in the transverse direction and the current interpretation of the Right Angle Lever Thought Experiment, as described in many texts, are incorrect. A final result is the determination of the manner in which the kinetic energy associated with a moving object (particle) is stored. Finally. it is shown that the reason it is considered that Special Relativity is not valid for accelerated reference frames is that it defines mass in different terms than those commonly used in mechanics. The difficulty with acceleration in Special Relativity vanishes when the non-relativistic definition of mass is used, namely that inertial mass is the incremental impulse required to produce an incremental change in velocity.

http://www.members.home.net/retiche/site.htm

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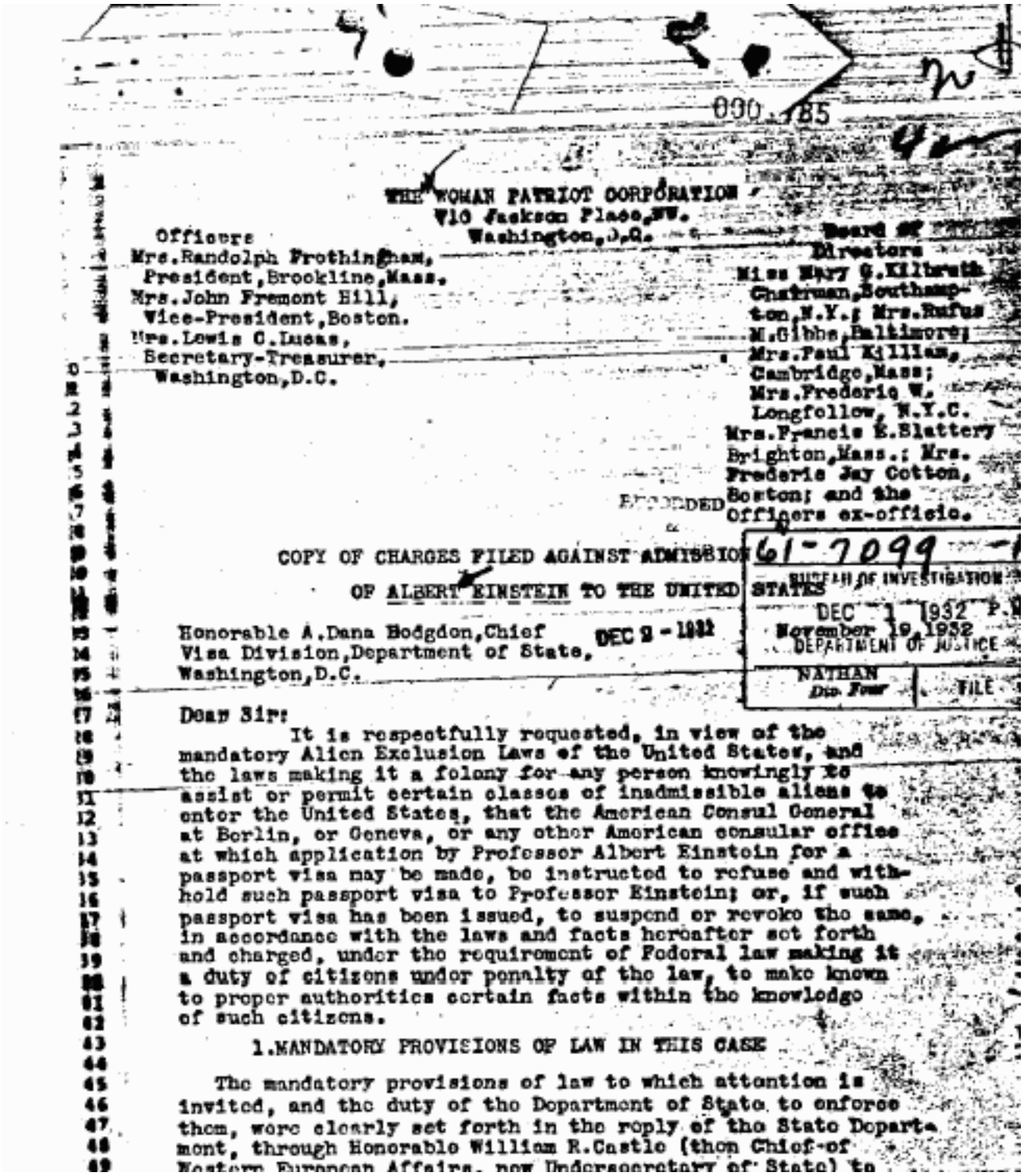
http://foia.fbi.gov/einstein.htm



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COPY OF CHARGES FILED AGAINST ADMISSION OF ALBERT EINSTEIN TO THE UNITED STATES

November 19, 1932

Honorable A. Dana Hodgdon, Chief
Visa Division, Department of State,
Washington, D.C.

DEC 2 - 1932

Dear Sir:

It is respectfully requested, in view of the mandatory Alien Exclusion Laws of the United States, and the laws making it a felony for any person knowingly to assist or permit certain classes of inadmissible aliens to enter the United States, that the American Consul General at Berlin, or Geneva, or any other American consular office at which application by Professor Albert Einstein for a passport visa may be made, be instructed to refuse and withhold such passport visa to Professor Einstein; or, if such passport visa has been issued, to suspend or revoke the same, in accordance with the laws and facts hereafter set forth and charged, under the requirement of Federal law making it a duty of citizens under penalty of the law, to make known to proper authorities certain facts within the knowledge of such citizens.

1. MANDATORY PROVISIONS OF LAW IN THIS CASE

The mandatory provisions of law to which attention is invited, and the duty of the Department of State to enforce them, were clearly set forth in the reply of the State Department, through Honorable William R. Castle (then Chief of Western European Affairs, now Undersecretary of State) to

lawyers for Countess Michael Karolyi. The material parts of that State Department ruling, dated November 14, 1925, follow:

"...The case...is governed by the laws relating to the admission of aliens to this country. Your attention is directed particularly to the following laws on the subject: .....The Act of October 16, 1918...as amended by the Act of June 5, 1920...

"The Department's action was taken pursuant to the duties imposed and the authority conferred by those laws; and it is, therefore, unable to comply with your request that a visa be granted to Countess Karolyi."

It is submitted that as the law has not been changed in this respect since the refusal of a passport visa to Countess Karolyi; and since the mandatory Alien Exclusion Laws are deemed more applicable to Professor Albert Einstein [illegible] they were to Countess Karolyi (whose visa was refused, [illegible]ct, rather under the discretionary Passport Control [illegible]May 22, 1918 as amended by the Act of March 2, 1921, as [illegible]h by the then Secretary of State, now Chief Justice [illegible]ans Hughes, in the Karolyi case) the "duties

The Nobel Prize in Physics 1905

"for his work on cathode rays"

Philipp Eduard Anton von Lenard

Germany

Kiel University
Kiel, Germany

b. 1862
(in Pressburg, then Austria-Hungary)
d. 1947

The Nobel Prize in Physics 1905
Presentation Speech

Philipp Lenard
Biography
Nobel Lecture
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http://www.space.com/scienceastronomy/astronomy/light_speed_000530.html

Scientists Try to Prove a Higher Speed of Light By Jack Lucentini posted: 01:42 pm ET 30 May 2000

Scientists have long believed nature has a speed limit.

It's the speed of light -- 186,000 miles (299,300 kilometers) per second. And the principle that nothing can go faster would mean most science-fiction tales of interstellar travel are impossible. At that speed, it would take us many generations to reach even the closest galaxies.

Now, however, physicists are coming closer to finding out how, in some situations, light may actually travel faster than that. But there are doubts as to whether the discoveries will have any practical use. An experiment by physicists in Florence, Italy provided what some call the clearest demonstration to date that light can indeed break its own speed limit.

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"It's very counterintuitive, but under certain circumstances you can have light travel in a vacuum in a mode which is faster than light," said Raymond Chiao, a physics professor at the University of California at Berkeley.

Light adores a vacuum

The study, published in the May 22 issue of the journal Physical Review Letters, was the first to show light apparently behaving this way in a vacuum -- that is, empty space -- experts said.

Several previous experiments had involved shooting light beams through a thin piece of material. The light waves, while crossing through the material, were slightly distorted in a way that forced them to arrive ahead of schedule.

The new experiment, led by Anedio Ranfagni of the Italian National Research Council, involved no such barriers. It involved shining light beams at a mirror, curved like the inside of a bowl. The mirror shot the beams back toward an instrument that measured the speed of the rays. The beam at the "axis" of the set-up -- that is, coming from the center of the mirror -- was clocked going at between about 5 and 7 percent above light speed.

Warp-speed machine: Faster-than-light travel will probably remain science fiction, but under special conditions pulses of light can outpace light waves in a vacuum.

However, the authors said, this effect only works over relatively short distances, like the 1 meter (a bit over a yard) covered in their set-up. Most physicists, however, say that while a beam may travel faster than light, such a beam cannot carry a signal, that is, information. A signal is a sudden change in the character of light waves within the beam -- for example, a change in the wavelength, the length of the wave.

Causality reversed

That's a key point for two reasons. First, if the light beam cannot contain a signal, it has no special practical use. Second, it rescues our common-sense understanding of causes and effects. That's because tried-and-tested physical equations show that if signals could outpace light speed, then causality would be reversed -- the results of an event would happen before the event itself.

In the study, the authors themselves don't claim the beams they created contain a signal.

"It's very counterintuitive, but under certain circumstances you can have light travel in a vacuum in a mode which is faster than light."

Nevertheless, the effects seen in the experiment are "promising candidates" for future research, the authors said. They added that the work "strongly simplifies the problem" of creating faster-than-light phenomena, by eliminating some of the complexities of previous experiments. Chiao, who led some of the previous research, claimed there is a limitation to both his own

work and that of the Italian physicists, which lends a quasi-illusory character to all their results.

If you shine a searchlight into space and spin it very quickly, the beam's far reaches will slice through space at faster-than-light speed. But there is no actual object moving at that speed.

The situation is somewhat similar for faster-than-light experiments to date, Chiao said. The beams contain a mathematical entity, called modes -- the patterns by which the waves hang together -- that outpace light. But there is no physical entity that does so.

"In one sense, it's accurate," he said. "In another, it's very misleading."

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THE OLD QUANTUM THEORY

BY

D. TER HAAR

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Fellow of Magdalen College, Oxford

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3 On a Heuristic Point of View about the Creation and Conversion of Light†

A. EINSTEIN

THERE exists an essential formal difference between the theoretical pictures physicists have drawn of gases and other ponderable bodies and Maxwell's theory of electromagnetic processes in so-called empty space. Whereas we assume the state of a body to be completely determined by the positions and velocities of an,' albeit very large, still finite number of atoms and electrons, we use for the determination of the electromagnetic state in space continuous spatial functions, so that a finite number of variables cannot be considered to be sufficient to fix completely the electromagnetic state in space. According to Maxwell's theory, the energy must be considered to be a continuous function in space for all purely electromagnetic phenomena, thus also for light, while according to the present-day ideas of physicists the energy of a ponderable body can be written as a sum over the atoms and electrons. The energy of a ponderable body cannot be split into arbitrarily many, arbitrarily small parts, while the energy of a light ray, emitted by a point source of light is according to Maxwell's theory (or in general according to any wave theory) of light distributed continuously over an ever increasing volume.

The wave theory of light which operates with continuous functions in space has been excellentlyjustified for the representation of purely optical phenomena and it is unlikely ever to be replaced by another theory. One should, however, bear in mind that optical observations refer to time averages and not to

† *Ann. Physik* **17**, 132 (1905).

instantaneous values and notwithstanding the complete experimental verification of the theory of diffraction, reflexion, refraction, dispersion, and so on, it is quite conceivable that a theory of light involving the use of continuous functions in space will lead to contradictions with experience, if it is applied to the phenomena of the creation and conversion of light.

In fact, it seems to me that the observations on "black-body radiation", photoluminescence, the production of cathode rays by ultraviolet light and other phenomena involving the emission or conversion of light can be better understood on the assumption that the energy of light is distributed discontinuously in space. According to the assumption considered here, when a light ray starting from a point is propagated, the energy is not continuously distributed over an ever increasing volume, but it consists of a finite number of energy quanta, localised in space, which move without being divided and which can be absorbed or emitted only as a whole.

In the following, I shall communicate the train of thought and the facts which led me to this conclusion, in the hope that the point of view to be given may turn out to be useful for some research workers in their investigations.

1. On a Difficulty in the Theory of "Black-body Radiation"

To begin with, we take the point of view of Maxwell's theory and electron theory and consider the following case. Let there be in a volume completely surrounded by reflecting walls, a number of gas molecules and electrons moving freely and exerting upon one another conservative forces when they approach each other, that is, colliding with one another as gas molecules according to the kinetic theory of gases.† Let there further be a number of electrons which are bound to points in space, which are far from one another, by forces proportional to the distance from those points and in the direction towards those points. These electrons are also assumed to be interacting conservatively with the free molecules and electrons as soon as the latter come close to them. We call the electrons bound to points in space "resonators"; they emit and absorb electromagnetic waves with definite periods.

† This assumption is equivalent to the preposition that the average kinetic energies of gas molecules and electrons are equal to one another in temperature equilibrium. It is well known that Mr. Drude has theoretically derived in this way the relation between the thermal and electrical conductivities of metals.

According to present-day ideas on the emission of light, the radiation in the volume considered—which can be found for the case of dynamic equilibrium on the basis of the Maxwell theory—must be identical with the "black-body radiation"—at least provided we assume that resonators are present of all frequencies to be considered.

For the time. being, we neglect the radiation emitted and absorbed by the resonators and look for the condition for dynamic equilibrium corresponding to the interaction (collisions) between molecules and electrons. Kinetic gas theory gives for this the condition that the average kinetic energy of a resonator electron must equal the average kinetic energy corresponding to the translational motion of a gas molecule. If we decompose the motion of a resonator electron into three mutually perpendicular directions of oscillation, we find for the average value $\bar{E}$ of the energy of such a linear oscillatory motion

$$\bar{E} = \frac{R}{N} T,$$

where R is the gas constant, N the number of "real molecules" in a gramme equivalent and T the absolute temperature. This follows as the energy $\bar{E}$ is equal to $\frac{2}{3}$ of the kinetic energy of a free molecules of a monatomic gas since the time averages of the kinetic and the potential energy of a resonator are equal to one another. If, for some reason—in our case because of radiation effects—one manages to make the time average of a resonator larger or smaller than $\bar{E}$, collisions with the free electrons and molecules will lead to an energy transfer to or from the gas which has a non-vanishing average. Thus, for the case considered by us,

dynamic equilibrium will be possible only if each resonator has the average energy $\bar{E}$.

We can now use a similar argument for the interaction between the resonators and the radiation which is present in space. Mr. Planck' has derived for this case the condition for dynamic equilibrium under the assumption that one can consider the radiation as the most random process imaginable.? He found

$$\bar{E}_\nu = \frac{L^3}{8\pi\nu^2}\rho_\nu,$$

where $\bar{E}_\nu$ is the average energy of a resonator with eigenfrequency ν (per oscillating component), L the velocity of light, ν the frequency and $\rho_\nu d\nu$ the energy per unit volume of that part of the radiation which has frequencies between ν and $\nu+d\nu$.

If the radiation energy of frequency ν is not to be either decreased or increased steadily, we must have

$$\frac{R}{N}T = \bar{E} = \bar{E}_\nu = \frac{L^3}{8\pi\nu^2}\rho_\nu,$$

† One can formulate this assumption as follows. We expand the z-component of the electrical force (Z) at a given point in space between the time $t=0$ and $t=T$ (where T indicates a time which is large compared to all oscillation periods considered) in a Fourier series

$$Z = \sum_{\nu=1}^{\infty} A_\nu \sin\left(2\pi\nu\frac{t}{T}+\alpha_\nu\right),$$

where $A_\nu \geqq 0$ and $0 \leqq \alpha_\nu \leqq 2\pi$. For the same point in space, one considers to have made such an expansion arbitrarily often with arbitrarily chosen initial times. In that case, we have for the frequency of different combinations of values for the quantities A_ν and α_ν (statistical) probabilities dW of the form

$$dW = f(A_1, A_2, \ldots, \alpha_1, \alpha_2, \ldots)\, dA_1\, dA_2 \ldots d\alpha_1\, d\alpha_2 \ldots.$$

Radiation is now the most random process imaginable, if

$$f(A_1, A_2, \ldots, \alpha_1, \alpha_2, \ldots) = F_1(A_1)F_2(A_2)\ldots f_1(\alpha_1)f_2(\alpha_2)\ldots,$$

that is, when the probability for a given value of one of the A or the α is independent of the values of the other A and α. The more closely the condition is satisfied that the separate pairs of quantities A_ν and α_ν depend on the emission and absorption processes of *special* groups of resonators, the more definitely can we thus say in the case treated by us that the radiation can be considered to be the most random imaginable one.

$$\rho_\nu = \frac{R}{N}\frac{8\pi\nu^2}{L^3}T.$$

This relation, which we found as the condition for dynamic equilibrium does not only lack agreement with experiment, but it also shows that in our picture there can be no question of a definite distribution of energy between aether and matter. The greater we choose the range of frequencies of the resonators, the greater becomes the radiation energy in space and in the limit we get

$$\int_0^\infty \rho_\nu\, d\nu = \frac{R}{N}\frac{8\pi}{L^3}T\int_0^\infty \nu^2\, d\nu = \infty.$$

2. On Planck's Determination of Elementary Quanta

We shall show in the following that determination of elementary quanta given by Mr. Planck is, to a certain extent, independent of the theory of "black-body radiation" constructed by him.

Planck's formula[2] for ρ_ν which agrees with all experiments up to the present is

$$\rho_\nu = \frac{\alpha\nu^3}{e^{\beta\nu/T}-1},$$

where $\alpha = 6{\cdot}10 \times 10^{-56}$, $\beta = 4{\cdot}866 \times 10^{-11}$.

For large values of T/ν, that is, for long wavelengths and high radiation densities, this formula has the following limiting form

$$\rho_\nu = \frac{\alpha}{\beta}\nu^2 T.$$

One sees that this formula agrees with the one derived in section 1 from Maxwell theory and electron theory, By equating the Coefficients in the two formulae, we get

$$\frac{R}{N}\frac{8\pi}{L^3} = \frac{\alpha}{\beta}$$

or $$N = \frac{\beta}{\alpha}\frac{8\pi R}{L^3} = 6{\cdot}17 \times 10^{23},$$

that is, one hydrogen atom weighs $1/N = 1{\cdot}62 \times 10^{-24}$ g. This is exactly the value found by Mr. Planck, which agrees satisfactorily with values of this quantity found by different means.

We thus reach the conclusion: the higher the energy density and the longer the wavelengths of radiation, the more usable is the theoretical basis used by us; for short wavelengths and low radiation densities, however, the basis fails completely.

In the following, we shall consider "black-body radiation", basing ourselves upon experience without using a picture of the creation and propagation of the radiation.

3. On the Entropy of the Radiation

The following considerations are contained in a famous paper by Mr. W. Wien and are only mentioned here for the sake of completeness.

Consider radiation which takes up a volume v. We assume that the observable properties of this radiation are completely determined if we give the radiation energy $\rho(\nu)$ for all frequencies.† As we may assume that radiations of different frequencies can be separated without work or heat, we can write the entropy of the radiation in the form

$$S = v\int_0^\infty \phi(\rho, \nu)\, d\nu,$$

where ϕ is a function of the variables p and ν. One can reduce ϕ, to a function of one variable only by formulating the statement that the entropy of radiation between reflecting walls is not changed by an adiabatic compression. We do not want to go into this, but at once investigate how one can obtain the function ϕ from the radiation law of a black body.

† This is an arbitrary assumption. Of course, one sticks to this simplest, assumption until experiments force us to give it up.

In the case of "black-body radiation", p is such a function of ν that the entropy is a maximum for a given energy, that is,

$$\delta\int_0^\infty \phi(\rho, \nu)\, d\nu = 0,$$

if $$\delta\int_0^\infty \rho\, d\nu = 0.$$

From this it follows that for any choice of $\delta\rho$ as function of ν

$$\int_0^\infty \left(\frac{\partial\phi}{\partial\rho} - \lambda\right)\delta\rho\, d\nu = 0,$$

where λ is independent of ν. In the case of black-body radiation, $\partial\phi/\partial\rho$ is thus independent of ν.

If the temperature of a black-body radiation in a volume $v = 1$ increases by dT, we have the equation

$$dS = \int_{\nu=0}^{\nu=\infty} \frac{\partial\phi}{\partial\rho}\, d\rho\, d\nu,$$

or, as $\partial\phi/\partial\rho$ is independent of ν:

$$dS = \frac{\partial\phi}{\partial\rho}\, dE.$$

As dE is equal to the heat transferred and as the process is reversible, we have also

$$dS = \frac{1}{T}\, dE.$$

Through comparing, we get

$$\frac{\partial\phi}{\partial\rho} = \frac{1}{T}\,*$$

This is the black-body radiation law. One can thus from the function ϕ obtain the black-body radiation law and conversely from the latter the function ϕ, through integration, bearing in mind that ϕ vanishes for $\rho = 0$.

4. Limiting Law for the Entropy of Monochromatic Radiation for Low Radiation Density

From the observations made so far on "black-body radiation", it is clear that the law

$$\rho = \alpha\nu^3 e^{-\beta\nu/T}$$

put forward originally for "black-body radiation" by Mr. W. Wien is not exactly valid. However; for large values of ν/T, it is in complete agreement with experiment. We shall base our calculations on this formula, though bearing in mind that our results are valid only within certain limits.

First of all, we get from this equation

$$\frac{1}{T} = -\frac{1}{\beta\nu}\ln\frac{\rho}{\alpha\nu^3},$$

and then, if we use the relation found in the preceding section

$$\phi(\rho,\nu) = -\frac{\rho}{\beta\nu}\left[\ln\frac{\rho}{\alpha\nu^3} - 1\right].$$

Let there now be radiation of energy E with a frequency between ν and $\nu + d\nu$ and let the volume of the radiation be v. The entropy of this radiation is

$$S = v\phi(\rho,\nu)\,d\nu = -\frac{E}{\beta\nu}\left[\ln\frac{E}{v\alpha\nu^3\,d\nu} - 1\right].$$

If we restrict ourselves to investigating the .dependence of the entropy on the volume occupied by the radiation, and if we denote the entropy of the radiation by S_0 if it occupies a volume v_0, we get

$$S - S_0 = \frac{E}{\beta\nu}\ln\frac{v}{v_0}.$$

This equation shows that the entropy of a monochromatic radiation of sufficiently small density varies with volume according

to the same rules as the entropy of a perfect gas or of a dilute solution. The equation just found will in the following be interpreted on the basis of the principle, introduced by Mr. Boltzmann into physics, according to which the entropy of a system is a function of the probability of its state.

5. Molecular–Theoretical Investigation of the Volume-dependence of the Entropy of Gases and Dilute Solutions

When calculating the entropy in molecular gas theory one often uses the word "probability" in a sense which is not the same as the definition of probability given in probability theory. Especially, often "cases of equal probability" are fixed by hypothesis under circumstances where the theoretical model used is sufficiently definite to deduce probabilities rather than fixing them by hypothesis. I shall show in a separate paper that when considering thermal phenomena it is completely sufficient to use the so-called "statistical probability", and I hope thus to do away with a logical difficulty which is hampering the consistent application of Boltzmann's principle. At the moment, however, I shall give its general formulation and the application to very special cases.

If it makes sense to talk about the probability of a state of a system and if, furthermore, any increase of entropy can be considered as a transition to a more probable state, the entropy S_1 of a system will be a function of the probability W_1 of its instantaneous state. If, therefore, one has two systems which do not interact with one another, one can write

$$S_1 = \phi_1(W_1), \quad S_2 = \phi_2(W_2).$$

If one considers these two systems as a single system of entropy S and probability W we have

$$S = S_1 + S_2 = \phi(W) \quad \text{and} \quad W = W_1 . W_2.$$

This last relation states that the states of the two systems are independent.

From these equations it follows that

$$\phi(W_1 \cdot W_2) = \phi_1(W_1) + \phi_2(W_2),$$

and hence finally

$$\phi_1(W_1) = C \ln W_1 + \text{const},$$
$$\phi_2(W_2) = C \ln W_2 + \text{const},$$
$$\phi(W) = C \ln W + \text{const}.$$

The quantity C is thus a universal constant; it follows from kinetic gas theory that it has the value R/N where the constants R and N have the same meaning as above. If S_0 is the entropy of a certain initial state of the system considered and W the relative probability of a state with entropy S, we have in general

$$S - S_0 = \frac{R}{N} \ln W.$$

We now consider the following special case. Let us consider a number, n, moving points (e.g., molecules) in a volume v_0. Apart from those, there may be in this space arbitrarily many other moving points of some kind or other. We do not make any assumptions about the laws according to which the points considered move in space, except that as far as their motion is concerned no part of space—and no direction—is preferred above others. The number of the (first-mentioned) points which we are considering be moreover so small that we can neglect their mutual interaction.

There corresponds a certain entropy S_0 to the system under consideration, which may be, for instance, a perfect gas or a dilute solution. Consider now the case where a part v of the volume v_0 contains all n moving points while otherwise nothing is changed in the system. This state clearly corresponds to a different value, S_1 of the entropy, and we shall now use Boltzmann's principle to determine the entropy difference.

We ask: how large is the probability of this state relative to the original state? Or: how large is the probability that at an arbitrary moment all n points moving independently of one another in a given volume v_0 are (accidentally) in the volume v?

One gets clearly for this probability, which is a "statistical probability":

$$W = \left(\frac{v}{v_0}\right)^n;$$

one obtains from this, applying Boltzmann's principle:

$$S - S_0 = R \frac{n}{N} \ln \frac{v}{v_0}.$$

It must be noted that it is unnecessary to make any assumptions about the laws, according to which the molecules move, to derive this equation from which one can easily derive thermodynamically the Boyle–Gay–Lussac law and the same law for the osmotic pressure.†

6. Interpretation of the Expression for the Volume-dependence of the Entropy of Monochromatic Radiation according to Boltzmann's Principle

In Section 4, we found for the volume-dependence of the entropy of monochromatic radiation the expression

$$S - S_0 = \frac{E}{\beta\nu} \ln \frac{v}{v_0}.$$

If we write this equation in the form

$$S - S_0 = \frac{R}{N} \ln \left[\left(\frac{v}{v_0} \right)^{NE/R\beta\nu} \right],$$

and compare it with the general formula which expresses

† If E is the energy of the system, we have

$$-d(E - TS) = p\,dv = T\,dS = RT \frac{n}{N} \frac{dv}{v}$$

or

$$pv = R \frac{n}{N} T.$$

Boltzmann's principle,

$$S - S_0 = \frac{R}{N} \ln W,$$

we arrive at the following conclusion:

If monochromatic radiation of frequency ν and energy E is enclosed (by reflecting walls) in a volume v_0, the probability that at an arbitrary time the total radiation energy is in a part v of the volume v_0 will be

$$W = \left(\frac{v}{v_0}\right)^{NE/R\beta\nu}.$$

From this we then conclude:

Monochromatic radiation of low density behaves—as long as Wien's radiation formula is valid—in a thermodynamic sense, as if it consisted of mutually independent energy quanta of magnitude $R\beta\nu/N$.

We now wish to compare the average magnitude of the "black-body" energy quanta with the average kinetic energy of the translational motion of a molecule at the same temperature. The latter is $\frac{3}{2}RT/N$, while we get from Wien's formula for the average magnitude of the energy quantum

$$\frac{\int_0^\infty \alpha\nu^3 e^{-\beta\nu/T}\, d\nu}{\int_0^\infty \frac{N}{R\beta\nu}\alpha\nu^3 e^{-\beta\nu/T}\, d\nu} = 3\frac{R}{N}T.$$

If monochromatic radiation—of sufficiently low density—behaves, as far as the volume-dependence of its entropy is concerned, as a discontinuous medium consisting of energy quanta of magnitude $R\beta\nu/N$, it is plausible to investigate whether the laws on creation and transformation of light are also such as if light consisted of such energy quanta. This question will be considered in the following.

7. On Stokes' Rule

Consider monochromatic light which is changed by photoluminescence to light of a different frequency; in accordance with the result we have just obtained, we assume that both the original and the changed light consist of energy quanta of magnitude $(R/N)\beta\nu$, where ν is the corresponding frequency. We must then interpret the transformation process as follows. Each initial energy quantum of frequency ν_1 is absorbed and is—at least when the distribution density of the initial energy quanta is sufficiently low—by itself responsible for the creation of a light quantum of frequency ν_2; possibly in the absorption of the initial light quantum at the same time also light quanta of frequencies $\nu_3, \nu_4, \ldots$ as well as energy of a different kind (e.g. heat) may be generated. It is immaterial through what intermediate processes the final result is brought about. Unless we can consider the photoluminescing substance as a continuous source of energy, the energy of a final light quantum can, according to the energy conservation law, not be larger than that of an initial light quantum; we must thus have the condition

$$\frac{R}{N}\beta\nu_2 \leqq \frac{R}{N}\beta\nu_1, \quad \text{or} \quad \nu_2 \leqq \nu_1$$

This is the well-known Stokes' rule.

We must emphasise that according to our ideas the intensity of light produced must—other things being equal—be proportional to the incident light intensity for weak illumination, as every initial quantum will cause one elementary process of the kind indicated above, independent of the action of the other incident energy quanta. Especially, there will be no lower limit for the intensity of the incident light below which the light would be unable to produce photoluminescence.

According to the above ideas about the phenomena deviations from Stokes' rule are imaginable in the following cases:

1. When the number of the energy quanta per unit volume

involved in transformations is so large that an energy quantum of the light produced may obtain its energy from several initial energy quanta.

2. When the initial (or final) light energetically does not have the properties characteristic for "black-body radiation" according to Wien's law; for instance, when the initial light is produced by a body of so high a temperature that Wien's law no longer holds for the wavelengths considered.

This last possibility needs particular attention. According to the ideas developed here, it is not excluded that a "non-Wienian radiation", even highly-diluted, behaves energetically differently than a "black-body radiation" in the region where Wien's law is valid.

8. On the Production of Cathode Rays by Illumination of Solids

The usual idea that the energy of light is continuously distributed over the space through which it travels meets with especially great difficulties when one tries to explain photo-electric phenomena, as was shown in the pioneering paper by Mr. Lenard.[3]

According to the idea that the incident light consists of energy quanta with an energy $R\beta\nu/N$, one can picture the production of cathode rays by light as follows. Energy quanta penetrate into a surface layer of the body, and their energy is at least partly transformed into electron kinetic energy. The simplest picture is that a light quantum transfers all of its energy to a single electron; we shall assume that that happens. We must, however, not exclude the possibility that electrons only receive part of the energy from light quanta. An electron obtaining kinetic energy inside the body will have lost part of its kinetic energy when it has reached the surface. Moreover, we must assume that each electron on leaving the body must produce work P, which is characteristic for the body. Electrons which are excited at the surface and at right angles to it will leave the body with the greatest normal velocity. The kinetic energy of such electrons is

$$\frac{R}{N}\beta\nu - P$$

If the body is charged to a positive potential Π and surrounded by zero potential conductors, and if Π is just able to prevent the loss of electricity by the body, we must have

$$\Pi\varepsilon = \frac{R}{N}\beta\nu - P,$$

where ε is the electrical mass of the electron, or

$$\Pi E = R\beta\nu - P',$$

where E is the charge of a gram equivalent of a single-valued ion and P' is the potential of that amount of negative electricity with respect to the body.†

If we put $E = 9{\cdot}6\times10^{3}$, $\Pi\times10^{-8}$ is the potential in Volts which the body assumes when it is irradiated in a vacuum.

To see now whether the relation derived here agrees, as to order of magnitude, with experiments, we put $P' = 0$, $\nu = 1{\cdot}03\times10^{15}$ (corresponding to the ultraviolet limit of the solar spectrum) and $\beta = 4{\cdot}866\times10^{-11}$. We obtain $\Pi\times10^{7} = 4{\cdot}3$ Volt, a result which agrees, as to order of magnitude, with Mr. Lenard's results.[3]

If the formula derived here is correct, Π must be, if drawn in Cartesian coordinates as a function of the frequency of the incident light, a straight line, the slope of which is independent of the nature of the substance studied.

As far as I can see, our ideas are not in contradiction to the properties of the photoelectric action observed by Mr. Lenard. If every energy quantum of the incident light transfers its energy to electrons independently of all other quanta, the velocity distribution of the electrons, that is, the quality of the resulting cathode radiation, will be independent of the intensity of the incident light; on the other hand, ceteris paribus, the number of

† If one assumes that it takes a certain amount of work to free a single electron by light from a neutral molecule, one has no need to change this relation; one only must consider P' to be the sum of two terms.

electrons leaving the body should be proportional to the intensity of the incident light.[3]

As far as the necessary limitations of these rules are concerned, we could make remarks similar to those about the necessary deviations from the Stokes rule.

In the preceding, we assumed that the energy of at least part of the energy quanta of the incident light was always transferred completely to a single electron. If one does not make this obvious assumption, one obtains instead of the earlier equation the following one

$$\Pi E + P' \leqq R\beta\nu.$$

For cathode-luminescence, which is the inverse process of the one just considered, we get by a similar argument

$$\Pi E + P' \geqq R\beta\nu.$$

For the substances investigated by Mr. Lenard, ΠE is always considerably larger than $R\beta\nu$, as the voltage which the cathode rays must traverse to produce even visible light is, in some cases a few hundred, in other cases thousands of volts.[3] We must thus assume that the kinetic energy of an electron is used to produce many light energy quanta.

9. On the Ionisation of Gases by Ultraviolet Light

We must assume that when a gas is ionised by ultraviolet light, always one absorbed light energy quantum is used to ionise just one gas molecule. From this follows first of all that the ionisation energy (that is, the energy theoretically necessary for the ionisation) of a molecule cannot be larger than the energy of an effective, absorbed light energy quantum. If J denotes the (theoretical) ionisation energy per gram equivalent, we must have

$$R\beta\nu \geqq J.$$

According to Lenard's measurements, the largest effective wavelength for air is about $1{\cdot}9 \times 10^{-5}$ cm, or

$$R\beta\nu = 6{\cdot}4 \times 10^{12} \text{ erg} \geqq J.$$

An upper limit for the ionisation energy can also be obtained from ionisation voltages in dilute gases. According to J. Stark[4] the smallest measured ionisation voltage (for platinum anodes) in air is about 10 Volt.† We have thus an upper limit of $9{\cdot}6 \times 10^{12}$ for J which is about equal to the observed one. There is still another consequence, the verification of which by experiment seems to me to be very important. If each light energy quantum which is absorbed ionises a molecule, the following relation should exist between the absorbed light intensity L and the number j of moles ionised by this light:

$$j = \frac{L}{R\beta\nu}.$$

This relation should, if our ideas correspond to reality, be valid for any gas which—for the corresponding frequency—does not show an appreciable absorption which is not accompanied by ionisation.

† In the interior of the gas, the ionisation voltage for negative ions is anyhow five times larger.

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INVESTIGATIONS ON THE THEORY OF THE BROWNIAN MOVEMENT

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III

A NEW DETERMINATION OF MOLECULAR DIMENSIONS

(From the ***Annalen der Physik*** (4), **19**, 1906, pp. 289-306. Corrections, *ibid.*, **34**, 1911, pp. 591-592.) **(23)**

THE kinetic theory of gases **made possible** the earliest determinations of the actual dimensions of the molecules, whilst physical phenomena observable in liquids have not, up to the present, served for the calculation of molecular dimensions. The explanation of this doubtless lies in the difficulties, hitherto unsurpassable, which discourage the development of a molecular kinetic theory of liquids that will extend to details. It will be shown now in this paper that the size of the molecules of the solute in an undissociated dilute solution can be found from the viscosity of the solution and of the pure solvent, and from the rate of diffusion of the solute into the solvent, if the volume of a molecule of the solute is large

compared with the volume of a molecule of the solvent. For such a solute molecule will behave approximately, with respect to its mobility in the solvent, and in respect to its influence on the viscosity of the latter, as a solid body suspended in the solvent, and it will be allowable to apply to the motion of the solvent in the immediate neighbourhood of a molecule the hydrodynamic equations, in which the liquid is considered homogeneous, and, accordingly, its molecular structure is ignored. We will choose for the shape of the solid bodies, which shall represent the solute molecules, the spherical form.

§ 1. On the Effect on the Motion of a Liquid of a Very Small Sphere Suspended in it

As the subject of our discussion, let us take an incompressible homogeneous liquid with viscosity k, whose velocity-components u, v, w will be given as functions of the co-ordinates x, y, z, and of the time. Taking an arbitrary point x_0, y_0, z_0, we will imagine that the functions u, v, w are developed according to Taylor's theorem as functions of $x - x_0, y - y_0, z - z_0$, and that a domain G is marked out around this point so small that within it only the linear terms in this expansion

have to be considered. The motion of the liquid contained in G can then be looked upon in the familiar manner as the result of the superposition of three motions, namely,

1. A parallel displacement of all the particles' of the liquid without change of their relative position.
2. A rotation of the liquid without change of the relative position of the particles of the liquid.
3. A movement of dilatation in three directions at sight angles to one another (the principal axes of dilatation).

We will imagine now a spherical rigid body in the domain G, whose centre lies at **the point** x_0, y_0, z_0, and whose dimensions are very small compared with those of the domain G, We will further assume **that the motion under** consideration is so slow that the kinetic energy of the sphere is negligible as well as that of the liquid. It will be further assumed that the velocity components of an element of surface of the sphere show agreement with the corresponding velocity components of the particles of the liquid in the immediate neighbourhood, that is, that the contact-layer (thought of as continuous) also exhibits

everywhere a viscosity-coefficient that is not vanishingly small.

It is clear without further discussion that the sphere simply shares in the partid motions 1 and 2, without modifying the motion of the neighbouring liquid, since the liquid moves as a rigid body in these partial motions; and that we have ignored the effects of inertia.

But the motion 3 will be modified by the presence of the sphere, and our next problem will be to investigate the influence of the sphere on this motion of the liquid. We will further refer the motion 3 to a co-ordinate system whose axes are parallel to the principal axes of dilatation, and we will put

$$x - x_0 = \xi,$$
$$y - y_0 = \eta,$$
$$z - z_0 = \zeta,$$

then the motion can be expressed by the equations

$$u_0 = A\xi,$$
$$v_0 = B\eta, \qquad (1)$$
$$w_0 = C\zeta,$$

in the case when the sphere is not present. A, B, C are constants which, on account of the incompressibility of the liquid, must fulfil the condition

$$A + B + C = 0 \qquad (2) \quad \cdot \quad \cdot \quad (24)$$

Now, if the rigid sphere with radius P is introduced at the point x_0, y_0, z_0, the motions of the liquid in its neighbourhood are modified. In the foliowing discussion we will, for the sake of convenience, speak of P as "finite"; whilst the values of ξ, η, ζ, for which the motions of the liquid are no longer appreciably influenced by the sphere, we will speak of as "infinitely great."

Firstly, it is clear from the symmetry of the motions of the liquid under consideration that there can be neither a translation nor a rotation of the sphere accompanying the motion in question, and we obtain the limiting conditions

$$u = v = w = 0 \text{ when } \rho = P$$

where we have put

$$\rho = \sqrt{\xi^2 + \eta^2 + \zeta^2} > 0.$$

Here u, v, w are the velocity-components of the motion now under consideration (modified by the sphere). If we put

$$(3) \qquad \begin{aligned} u &= A\xi + u_1, \\ v &= B\eta + v_1, \\ w &= C\zeta + w_1, \end{aligned}$$

since the motion defined by equation (3) must be transformed into that defined by equations (1) in the "infinite" region, the velocities u_1, v_1, w_1 will vanish in the latter region.

The functions u, v, w must satisfy the hydrodynamic equations with due reference to the viscosity, and ignoring inertia. Accordingly, the following equations will hold :— (*)

$$(4) \quad \begin{cases} \frac{\partial p}{\partial \xi} = k\Delta u, & \frac{\partial p}{\partial \eta} = k\Delta v, & \frac{\partial p}{\partial \zeta} = k\Delta w, & \frac{\partial u}{\partial \xi} + \frac{\partial v}{\partial \eta} + \frac{\partial w}{\partial \zeta} = 0, \end{cases}$$

where Δ stands for the operator

$$\frac{\partial^2}{\partial \xi^2} + \frac{\partial^2}{\partial \eta^2} + \frac{\partial^2}{\partial \zeta^2}$$

and p for the hydrostatic pressure.

Since the equations (1) are solutions of the equations (4) and the latter are linear, according to (3) the quantities u_1, v_1, w_1 must also satisfy the equations (4). I have determined u_1, v_1, w_1, and p, according to a method given in the lecture of Kirchhoff quoted in § 4 (†), and find

(*) G. Kirchhoff, "Lectures on Mechanics," Lect. 26.

(†) "From the equations (4) it follows that $\Delta p = 0$. If p is chosen in accordance with this condition, and a function V is determined which satisfies the equation

$$\Delta V = \frac{1}{k} p,$$

then the equations (4) are satisfied if we put

$$u = \frac{\partial V}{\partial \xi} + u', \quad v = \frac{\partial V}{\partial \eta} + v', \quad w = \frac{\partial V}{\partial \zeta} + w'$$

and chose u', v', w', so that $\Delta u' = 0$, $\Delta v' = 0$, and $\Delta w' = 0$, and

$$\frac{\partial u'}{\partial \xi} + \frac{\partial v'}{\partial \eta} + \frac{\partial w'}{\partial \zeta} = -\frac{1}{k} p."$$

$$p = -\frac{5}{3}kP^3\left\{A\frac{\partial^2\left(\frac{1}{\rho}\right)}{\partial\xi^2} + B\frac{\partial^2\left(\frac{1}{\rho}\right)}{\partial\eta^2} + G\frac{\partial^2\left(\frac{1}{\rho}\right)}{\partial\zeta^2}\right\} + \text{const.}$$

$$(5)\quad \begin{cases} u = A\xi - \frac{5}{3}P^3A\frac{\xi}{\rho^3} - \frac{\partial D}{\partial\xi}, \\ v = B\eta - \frac{5}{3}P^3B\frac{\eta}{\rho^3} - \frac{\partial D}{\partial\eta}, \\ w = G\zeta - \frac{5}{3}P^3G\frac{\zeta}{\rho^3} - \frac{\partial D}{\partial\zeta}, \end{cases}$$

Now if we put

$$\frac{p}{k} = 2c\frac{\partial^2\frac{1}{\rho}}{\partial\xi^2}$$

and in agreement with this

$$V = c\frac{\partial^2\rho}{\partial\xi^2} + b\frac{\partial^2\frac{1}{\rho}}{\partial\xi^2} + \frac{a}{2}\left(\xi^2 - \frac{\eta^2}{2} - \frac{\zeta^2}{2}\right)$$

and

$$u' = -2c\frac{\partial\frac{1}{\rho}}{\partial\xi},\quad v' = 0,\quad w' = 0,$$

the constants a, b, e can be chosen so that when $\rho = p$, $u = v = w = 0$. By superposition of three similar solutions we obtain the solution given in the equations (5) and (5a).

where

$$(5a)\quad \begin{cases} D = A\left\{\frac{5}{6}P^3\frac{\partial^2\rho}{\partial\xi^2} + \frac{1}{6}P^5\frac{\partial^2\left(\frac{1}{\rho}\right)}{\partial\xi^2}\right\} \\ \quad + B\left\{\frac{5}{6}P^3\frac{\partial^2\rho}{\partial\eta^2} + \frac{1}{6}P^5\frac{\partial^2\left(\frac{1}{\rho}\right)}{\partial\eta^2}\right\} \\ \quad + G\left\{\frac{5}{6}P^3\frac{\partial^2\rho}{\partial\zeta^2} + \frac{1}{6}P^5\frac{\partial^2\left(\frac{1}{\rho}\right)}{\partial\zeta^2}\right\}. \end{cases}$$

It is easy to see that the equations (5) are solutions of the equations (4). Then, since

$$\Delta\xi = 0,\quad \Delta\frac{1}{\rho} = 0,\quad \Delta\rho = \frac{2}{\rho}$$

and

$$\Delta\left(\frac{\xi}{\rho^3}\right) = -\frac{\partial}{\partial\xi}\left\{\Delta\left(\frac{1}{\rho}\right)\right\} = 0,$$

we get

$$k\Delta u = -k\frac{\partial}{\partial\xi}\{\Delta D\}$$

$$= -k\frac{\partial}{\partial\xi}\left\{\frac{5}{3}P^3A\frac{\partial^2\frac{1}{\rho}}{\partial\xi^2} + \frac{5}{3}P^3B\frac{\partial^2\frac{1}{\rho}}{\partial\eta^2} + \dots\right\}.$$

But the last expression obtained is, according to the first of the equations (5), identical with $dp/d\xi$. In similar manner, we can show that the second

and third of the equations (4) are satisfied. We obtain further—

$$\frac{\partial u}{\partial \xi}+\frac{\partial v}{\partial \eta}+\frac{\partial w}{\partial \zeta}=(A+B+C)$$
$$+\frac{5}{3}P^3\left\{A\frac{\partial^2\left(\frac{1}{\rho}\right)}{\partial \xi^2}+B\frac{\partial^2\left(\frac{1}{\rho}\right)}{\partial \eta^2}+C\frac{\partial^2\left(\frac{1}{\rho}\right)}{\partial \zeta^2}\right\}-\Delta D.$$

But since, according to equation (5a),

$$\Delta D=\frac{5}{3}P^3\left\{A\frac{\partial^2\left(\frac{1}{\rho}\right)}{\partial \xi^2}+B\frac{\partial^2\left(\frac{1}{\rho}\right)}{\partial \eta^2}+C\frac{\partial^2\left(\frac{1}{\rho}\right)}{\partial \zeta^2}\right\},$$

it follows that the last of the equations (4) is satisfied. As for the boundary conditions, our equations for u, v, w are transformed into the equations (1) only when ρ is indefinitely large. By inserting the value of D from the equation (5a) in the second of the equations (5) we get

$$(6)\quad u=A\xi-\frac{5}{2}\frac{P^3}{\rho^5}\xi(A\xi^2+B\eta^2+C\zeta^2)$$
$$+\frac{5}{2}\frac{P^5}{\rho^7}\xi(A\xi^2+B\eta^2+C\zeta^2)-\frac{P^5}{\rho^5}A\xi \quad (25)$$

We know that u vanishes when $\rho=P$. On the grounds of symmetry the same holds for v and w. We have now demonstrated that in the equations (5) a solution has been obtained to satisfy both the equations (4) and the boundary conditions of the problem.

It can also be shown that the equations (5) are the only solutions of the equations (4) consistent with the boundary conditions of the problem. The proof will only be indicated here. Suppose that, in a finite space, the velocity-components of a liquid u, v, w satisfy the equations (4). Now, if another solution U, V, W of the equations (4) can exist, in which on the boundaries of the sphere in question $U=u$, $V=v$, $W=w$, then ($U-u$, $V-v$, $W-w$) will be a solution of the equations (4), in which the velocity-components vanish at the boundaries of the space. Accordingly, no mechanical work can be done on the liquid contained in the space in question. Since we have ignored the kinetic energy of the liquid, it follows that the work transformed into heat in the space in question is likewise equal to zero. Hence we infer that in the whole space we must have $u=u'$, $v=v'$, $w=w'$, if the space is bounded, at least in part, by stationary walls. By crossing the boundaries, this result can also be extended to the case when the space in question is infinite, as in the case considered above. We can show thus that the solution obtained above is the sole solution of the problem.

We will now place around the point x_0, y_0, z_0 a sphere of radius R, where R is indefinitely large compared with P, and will calculate the energy which is transformed into heat (per unit of time) in the liquid lying within the sphere. This energy W is equal to the mechanical work done on the liquid. If we call the components of the pressure exerted on the surface of the sphere of radius R, X_n, Y_n, Z_n, then

$$W = \int (X_n u + Y_n v + Z_n w) ds$$

where the integration is extended over the surface of the sphere of radius R.

Here

$$X_n = -\left(X_\xi \frac{\xi}{\rho} + X_\eta \frac{\eta}{\rho} + X_\zeta \frac{\zeta}{\rho}\right),$$
$$Y_n = -\left(Y_\xi \frac{\xi}{\rho} + Y_\eta \frac{\eta}{\rho} + Y_\zeta \frac{\zeta}{\rho}\right),$$
$$Z_n = -\left(Z_\xi \frac{\xi}{\rho} + Z_\eta \frac{\eta}{\rho} + Z_\zeta \frac{\zeta}{\rho}\right),$$

where

$$X_\xi = p - 2k\frac{\partial u}{\partial \xi}, \qquad Y_\zeta = Z_\eta = -k\left(\frac{\partial v}{\partial \zeta} + \frac{\partial w}{\partial \eta}\right)$$
$$Y_\eta = p - 2k\frac{\partial v}{\partial \eta}, \qquad Z_\xi = X_\zeta = -k\left(\frac{\partial w}{\partial \xi} + \frac{\partial u}{\partial \zeta}\right)$$
$$Z_\zeta = p - 2k\frac{\partial w}{\partial \zeta}, \qquad X_\eta = Y_\xi = -k\left(\frac{\partial u}{\partial \eta} + \frac{\partial v}{\partial \xi}\right).$$

The expressions for u, v, w are simplified when we note that for $\rho = R$ the terms with the factor P^5/ρ^5 vanish.

We have to put

$$u = A\xi - \frac{5}{2}P^3\frac{\xi(A\xi^2 + B\eta^2 + C\zeta^2)}{\rho^5}$$
$$v = B\eta - \frac{5}{2}P^3\frac{\eta(A\xi^2 + B\eta^2 + C\zeta^2)}{\rho^5} \qquad (6a)$$
$$w = C\zeta - \frac{5}{2}P^3\frac{\zeta(A\xi^2 + B\eta^2 + C\zeta^2)}{\rho^5}$$

For p we obtain from the first of the equations (5) by corresponding omissions

$$p = -5kP^3\frac{A\xi^2 + B\eta^2 + C\zeta^2}{\rho^5} + \text{const.}$$

We obtain first

$$X_\xi = -2kA + 10kP^3\frac{A\xi^2}{\rho^5} - 25kP^3\frac{\xi^2(A\xi^2 + B\eta^2 + C\zeta^2)}{\rho^7}$$
$$X_\eta = +5kP^3\frac{(A+B)\xi\eta}{\rho^5} - 25kP^3\frac{\xi\eta(A\xi^2 + B\eta^2 + C\zeta^2)}{\rho^7} \qquad (23)$$
$$X_\zeta = +5kP^3\frac{(A+C)\xi\zeta}{\rho^5} - 25kP^3\frac{\xi\zeta(A\xi^2 + B\eta^2 + C\zeta^2)}{\rho^7}$$

and from this

$$X_n = 2Ak\frac{\xi}{\rho} - 5AkP^3\frac{\xi}{\rho^4} + 20kP^3\frac{\xi(A\xi^2 + B\eta^2 + C\zeta^2)}{\rho^6}. \qquad (23)$$

With the aid of the expressions for Y_n and Z_n, obtained by cyclic exchange, we get, ignoring all

terms which involve the ratio P/ρ raised to any power higher than the third,

$$X_n u + Y_n v + Z_n w = \frac{2k}{\rho}(A^2\xi^2 + B^2\eta^2 + C^2\zeta^2)$$
$$- 5k\frac{P^3}{\rho^4}(A^2\xi^2 + B^2\eta^2 + C^2\zeta^2) + 15k\frac{P^6}{\rho^6}(A\xi^2 + B\eta^2 + C\zeta^2)^2. \quad (23)$$

If we integrate over the sphere and bear in mind that

$$\int ds = 4R^2\pi,$$
$$\int \xi^2 ds = \int \eta^2 ds = \int \zeta^2 ds = \tfrac{4}{3}\pi R^4,$$
$$\int \xi^4 ds = \int \eta^4 ds = \int \zeta^4 ds = \tfrac{4}{5}\pi R^6,$$
$$\int \eta^2\zeta^2 ds = \int \zeta^2\xi^2 ds = \int \xi^2\eta^2 ds = \tfrac{4}{15}\pi R^6,$$
$$\int (A\xi^2 + B\eta^2 + C\zeta^2)^2 ds = \tfrac{8}{15}\pi R^6(A^2 + B^2 + C^2), \quad (23)$$

we obtain

$$(7) \quad W = \tfrac{8}{3}\pi R^3 k\delta^2 + \tfrac{4}{3}\pi P^3 k\delta^2 = 2\delta^2 k\left(V + \frac{\Phi}{2}\right), \quad (23)$$

where we put

$$\delta^2 = A^2 + B^2 + C^2,$$
$$\frac{4\pi}{3}R^3 = V \text{ and } \frac{4}{3}\pi P^3 = \Phi$$

If the suspended sphere were not present ($\Phi = 0$), then we should get for the energy used up in the volume V,

$$(7a) \qquad W = 2\delta^2 kV.$$

On account of the presence of the sphere, the energy used up is therefore diminished by $\delta^2 k\Phi$.

(26)

§ 2. Calculation of the Viscosity-Coefficient of a Liquid in which a Large Number of Small Spheres are Suspended in Irregular Distribution

In the preceding discussion we have considered the case when there is suspended in a domain G, of the order of magnitude defined above, a sphere that is very small compared with this domain, and have investigated how this influenced the motion of the liquid. We will now assume that an indefinitely large number of spheres are distributed in the domain G, of similar radius and actually so small that the volume of all the spheres together is very small compared with the domain G. Let the number of spheres present in unit volume be n, where n is sensibly constant everywhere in the liquid.

We will now start once more from the motion of a homogeneous liquid, without suspended spheres, and consider again the most general motion of dilatation. If no spheres are present, by suitable choice of the co-ordinate system we can express the velocity components u_0, v_0, w_0, in the arbitrarily-chosen point x, y, z in the domain G, by the equations

$$u_0 = Ax,$$
$$v_0 = By,$$
$$w_0 = Cz,$$

where $A + B + C = 0.$

Now a sphere suspended at the point x_ν, y_ν, z_ν, will affect this motion in a manner evident from the equation (6). Since we have assumed that the average distance between neighbouring spheres is very great compared with their radius, and consequently the additional velocity-components originating from all the suspended spheres together are very small compared with u_0, v_0, w_0, we get for the velocity-components u, v, w in the liquid, taking into account the suspended spheres and neglecting terms of higher orders—

$$(8)\quad \begin{cases} u = Ax - \Sigma\left\{\frac{5}{2}\frac{P^3}{\rho_\nu^2}\frac{\xi_\nu(A\xi_\nu^2 + B\eta_\nu^2 + C\zeta_\nu^2)}{\rho_\nu^3} - \frac{5}{2}\frac{P^3}{\rho_\nu^4}\frac{\xi_\nu(A\xi_\nu^2 + B\eta_\nu^2 + C\zeta_\nu^2)}{\rho_\nu^3} + \frac{P^5}{\rho_\nu^4}\frac{A\xi_\nu}{\rho_\nu}\right\}, \\ v = By - \Sigma\left\{\frac{5}{2}\frac{P^3}{\rho_\nu^2}\frac{\eta_\nu(A\xi_\nu^2 + B\eta_\nu^2 + C\zeta_\nu^2)}{\rho_\nu^3} - \frac{5}{2}\frac{P^5}{\rho_\nu^4}\frac{\eta_\nu(A\xi_\nu^2 + B\eta_\nu^2 + C\zeta_\nu^2)}{\rho_\nu^3} + \frac{P^5}{\rho_\nu^4}\frac{B\eta_\nu}{\rho_\nu}\right\}, \\ w = Cz - \Sigma\left\{\frac{5}{2}\frac{P^3}{\rho_\nu^2}\frac{\zeta_\nu(A\xi_\nu^2 + B\eta_\nu^2 + C\zeta_\nu^2)}{\rho_\nu^3} - \frac{5}{2}\frac{P^5}{\rho_\nu^4}\frac{\zeta_\nu(A\xi_\nu^2 + B\eta_\nu^2 + C\zeta_\nu^2)}{\rho_\nu^3} + \frac{P^5}{\rho_\nu^4}\frac{C\zeta_\nu}{\rho_\nu}\right\}, \end{cases}$$

where the summation is extended over all spheres in the domain G, and we put

$$\xi_\nu = x - x_\nu,$$
$$\eta_\nu = y - y_\nu, \qquad \rho_\nu = \sqrt{\xi_\nu^2 + \eta_\nu^2 + \zeta_\nu^2},$$
$$\zeta_\nu = z - z_\nu.$$

x_ν, y_ν, z_ν are the Co-ordinates of the centre of the sphere.. Further, we 'conclude from the equations (7) and (7a) that the presence of each of the spheres has a result (neglecting indefinitely small quantities of a higher order) (23) in an increase of the heat production per unit volume, and that the energy per unit volume transformed into heat in the domain G has the value

$$W = 2\delta^2 k + n\delta^2 k\Phi, \quad . \quad . \quad (23)$$

or

$$(7b)\qquad W = 2\delta^2 k\left(1 + \frac{\phi}{2}\right), \quad . \quad . \quad (23)$$

where ϕ denotes the fraction of the volume occupied by the spheres.

From the equation (7b) the viscosity-coefficient can be calculated of the heterogeneous mixture of liquid and suspended spheres (hereafter termed briefly "mixture") under discussion; but we must bear in mind that A, B, C are not the values of the principal dilatations in the motion of the liquid defined by the equations (8), (23); we will call

the principal dilatations of the mixture A^*, B^*, C^*. On the grounds of symmetry it follows that the principal directions of dilatation of the mixture are parallel to the directions of the principal dilatations A, B, C, and therefore to the Co-ordinate axes. If we write the equations (8) in the form

$$u = Ax + \Sigma u_\nu,$$
$$v = By + \Sigma v_\nu,$$
$$w = Cz + \Sigma w_\nu,$$

we get

$$A^* = \left(\frac{\partial u}{\partial x}\right)_{x=0} = A + \Sigma\left(\frac{\partial u_\nu}{\partial x}\right)_{x=0} = A - \ldots C\left(\frac{\partial w_\nu}{\partial x}\right)_{x=0}.$$

If we exclude from our discussion the immediate neighbourhood of the single spheres, we can omit the second and third terms of the expressions for u, v, w, and obtain when $x = y = z = 0$:—

$$(9)\quad \begin{cases} u_\nu = -\frac{5}{2}\frac{P^3}{r_\nu^2}\frac{x_\nu(Ax_\nu^2 + By_\nu^2 + Cz_\nu^2)}{r_\nu^3}, \\ v_\nu = -\frac{5}{2}\frac{P^3}{r_\nu^2}\frac{y_\nu(Ax_\nu^2 + By_\nu^2 + Cz_\nu^2)}{r_\nu^3}, \\ w_\nu = -\frac{5}{4}\frac{P^3}{r_\nu^2}\frac{z_\nu(Ax_\nu^2 + Bz_\nu^2 + Cz_\nu^2)}{r_\nu^3} \end{cases}$$

where we put

$$r_\nu = \sqrt{x_\nu^2 + y_\nu^2 + z_\nu^2} > 0.$$

We extend the summation throughout the volume of a sphere K of very large radius R, whose centre lies at the origin of the Co-ordinate system. If we assume further that the irregularly distributed spheres are now evenly distributed and introduce an integral in place of the summation, we obtain

$$A^* = A - n\int_K \frac{\partial u_\nu}{\partial x_\nu} dx_\nu dy_\nu dz_\nu,$$
$$= A - n\int \frac{u_\nu x_\nu}{r_\nu} ds \quad . \quad . \quad (27)$$

where the last integration is to be extended over the surface of the sphere K. Having regard to (9) we find

$$A^* = A - \frac{5}{2}\frac{P^3}{R^6} n \int x_0^2(Ax_0^2 + By_0^2 + Cz_0^2) ds$$
$$= A - n\left(\frac{4}{3}P^3\pi\right)A = A(1 - \phi).$$

By analogy

$$B^* = B(1 - \phi),$$
$$C^* = C(1 - \phi).$$

We will put.

$$\delta^{*2} = A^{*2} + B^{*2} + C^{*2},$$

then neglecting indefinitely small quantities of higher order,

$$\delta^{*2} = \delta^2(1 - 2\phi).$$

We have found for the development of heat per unit of time and volume

$$W^* = 2\delta^2 k\left(1 + \frac{\phi}{2}\right) \quad . \quad . \quad (23)$$

Let us call the viscosity-coefficient of the mixture k^*, then

$$W^* = 2\delta^{*2} k^*.$$

From the last three equations we obtain (neglecting indefinitely small quantities of higher order)

$$k^* = k(1 + 2{\cdot}5\phi) \quad . \quad . \quad (23)$$

We reach, therefore, the result :—

If very small rigid spheres are suspended in a liquid, the coefficient of internal friction is thereby increased by a fraction which is equal to 2·5 times the total volume of the spheres suspended in a unit volume, provided that this total volume is very small.

§ 3. On the Volume of a Dissolved Substance of Molecular Volume Large in Comparison with that of the Solvent

Consider a dilute solution of a substance which does not dissociate in the solution. Suppose that a molecule of the dissolved substance is large compared with a molecule of the solvent ; and can be thought of as a rigid sphere of radius P. We can then apply the result obtained in Paragraph 2.

If k^* be the viscosity of the solution, k 'that of the pure solvent, then

$$\frac{k^*}{k} = 1 + 2{\cdot}5\phi, \quad . \quad . \quad . \quad (23)$$

where ϕ is the total volume of the molecules present in the solution per unit volume.

We will calculate ϕ for a 1 per cent. aqueous sugar solution. According to the observations of Burkhard (Landolt and Börnstein Tables) $k^*/k = 1{\cdot}0245$ (at 20° C.) for a 1 per cent. aqueous sugar solution ; therefore $\phi = 0{\cdot}0245$ for (approximately) 0·01 gm. of sugar. A gram of sugar dissolved in water has therefore the same effect on the viscosity as small suspended rigid spheres of total volume 0·98 c.c. (23)

We must recollect here that 1 gm. of solid sugar has the volume 0·61 c.c. We shall find the same value for the specific volume s of the sugar present in solution if the sugar solution is looked upon as a mixture of water and sugar in a dissolved form. The specific gravity of a 1 per cent. aqueous sugar solution (referred to water at the same temperature) at 17·5° is 1·00388. We have then (neglecting the difference in the density of water at 4° and at 17·5°)—

$$\frac{1}{1{\cdot}00388} = 0{\cdot}99 + 0{\cdot}01s.$$

Therefore

$$s = 0{\cdot}61.$$

While, therefore, the sugar solution behaves, as to its density, like a mixture of water and solid sugar, the effect on the viscosity is one and one-half times greater than would have resulted from the suspension of an equal mass of sugar. It appears to me that this result can hardly be explained in the light of the molecular theory, in any other manner than by assuming that the sugar molecules present in solution limit the mobility of the water immediately adjacent, so that a quantity of water, whose volume is approximately one-half (23) the volume of the sugar-molecule, is bound on to the sugar-molecule.

We can say, therefore, that a dissolved sugar molecule (or the molecule together with the water held bound by it respectively) behaves in hydrodynamic relations as a sphere of volume $0{\cdot}98 \cdot 342/N$ c.c. (23), where 342 is the molecular weight of sugar and N the number of actual molecules in a gram-molecule.

§ 4. On the Diffusion of an Undissociated Substance in Solution in a Liquid

Consider such a solution as was dealt with in Paragraph 3. If a force K acts on the molecule, which we will imagine as a sphere of radius P, the molecule will move with a velocity ω which

is determined by P and the viscosity k of the solvent.

That is, the equation holds:—(*)

$$\omega = \frac{K}{6\pi k P} \quad . \quad . \quad . \quad (6) \tag{1}$$

We will use this relation for the calculation of the diffusion-coefficient of an undissociated solution. If p is the osmotic pressure of the dissolved substance, which is looked upon as the only force producing motion in the dilute solution under consideration, then the force exerted in the direction of the X-axis on the dissolved substance per unit volume of the solution $= -dp/dx$. If there are ρ grams in a unit volume and m is the molecular weight of the dissolved substance, N the number of actual molecules' in a gram-molecule, then $(\rho/m)N$ is the number of (actual) molecules in a unit of volume, and the force acting on a molecule as a result of the fall in concentration will be

$$K = -\frac{m}{\rho N}\frac{\partial p}{\partial x}. \tag{2}$$

If the solution is sufficiently dilute, the osmotic pressure is given by the equation

$$p = \frac{R}{m}\rho T, \tag{3}$$

(*) G. Kirchhoff, "Lectures on Mechanics," Lect. 26 (22).

where T is the absolute temperature and $R = 8{\cdot}31 \cdot 10^7$. From the equations (1), (2), and (3) we obtain for the velocity of movement of the dissolved substance

$$\omega = -\frac{RT}{6\pi k}\frac{1}{NP}\frac{\partial \rho}{\partial x}.$$

Finally, the weight of substance passing per unit of time across unit area in the direction of the X-axis will be

$$\omega\rho = -\frac{RT}{6\pi k}\cdot\frac{1}{NP}\frac{\partial \rho}{\partial x}. \tag{4}$$

We, obtain therefore for the diffusion coefficient D—

$$D = \frac{RT}{6\pi k}\cdot\frac{1}{NP}.$$

Accordingly, we can calculate from the diffusion-coefficient and the coefficient of viscosity of the solvent, the value of the product of the number N of actual molecules in a gram-molecule and of the hydrodynamically-effective radius P of the molecule.

In this calculation osmotic pressure is treated as a force acting on the individual molecules, which evidently does not correspond with the conceptions of the kinetic-molecular theory, since, according to the latter, the osmotic pressure in

the case under discussion must be thought of as a virtual force only. However, this difficulty vanishes if we reflect that (dynamic) equilibrium with the (virtual) osmotic forces, which correspond to the differences in concentration of the solution, can be established by the aid of a numerically equal force acting on the single molecules in the opposite direction; as can easily be established following thermodynamic methods.

Equilibrium can be obtained with the osmotic force acting on unit mass, $-\frac{1}{\rho}\frac{\partial \rho}{\partial x}$, by the force $-Px$ (applied to the individual solute molecules) if

$$-\frac{1}{\rho}\frac{\partial \rho}{\partial x} - Px = 0.$$

If we imagine, therefore, two mutually eliminating systems of forces Px and $-Px$ applied to the dissolved substance (per unit mass), then $-Px$ establishes equilibrium with the osmotic pressure and only the force Px, numerically equal to the osmotic pressure, remains over as cause of motion. Thus the difficulty mentioned is overcome.(*)

(*) A detailed statement of this train of thought will be found in *Ann. d. Phys.*, **17**, 1905, p. 549.

§ 5. Determination of Molecular Dimensions with the Help of the Relations already Obtained

We found in Paragraph 3

$$\frac{k^*}{k} = 1 + 2{\cdot}5\phi = 1 + 2{\cdot}5n \cdot \frac{4}{3}\pi P^3 \qquad (23)$$

where n is the number of solute molecules per unit volume and P the hydrodynamically-effective radius of the molecule. If we bear in mind that

$$\frac{N}{n} = \frac{\rho}{m}$$

where ρ is the mass of the dissolved substance present in unit volume and m is its molecular weight, we obtain

$$NP^3 = \frac{3}{10\pi}\frac{m}{\rho}\left(\frac{k^*}{k} - 1\right).$$

On the other hand, we found in § 4

$$NP = \frac{RT}{6\pi k}\frac{1}{D'}$$

These two equations put us in the position to calculate each of the quantities P and N, of which N must show itself to be independent of the nature of the solvent, of the solute and of the temperature, if our theory is to correspond with the facts.

We will carry out the calculation for an aqueous sugar solution. Firstly, it follows from the data given above for the viscosity of sugar solution at 20° C.

$$NP^3 = 80 \quad . \quad . \quad . \quad (23)$$

According to the researches of Graham (calculated out by Stephan), the diffusion-coefficient of sugar in water at 9·5° is 0·384, if the day is taken as unit of time. The viscosity of water at 9·5° is 0·0135. We will insert these data in our formula for the diffusion-coefficient, although they were obtained with 10 per cent. solutions, and it is not to be expected that our formula will be precisely valid at so high a concentration. We get

$$NP = 2{\cdot}08 \cdot 10^{16}.$$

It follows from the values found for NP^3 and NP, if we ignore the difference in P at 9·5° and 20°, that

$$P = 6{\cdot}2 \cdot 10^{-8} \text{ cm.} \quad . \quad . \quad (23)$$
$$N = 3{\cdot}3 \cdot 10^{23}.$$

The value found for N agrees satisfactorily, in order of magnitude, with the values obtained by other methods for this quantity.

Berne, 30 *April*, 1905.

(Received, 19 *August*, 1905.)

Supplement

In the new edition of Landolt and Börnstein's "Physical-Chemical Tables" will be found very useful data for the calculation of the size of the sugar molecule, and the number N of the actual molecules in a gram-molecule. Thovert found (Table, p. 372) for the diffusion-coefficient of sugar in water at 18·5° C. and the concentration 0·005 mol./litre the value 0·33 cm.²/day. From a table (p. 81), with the results of observations made by Hosking, we find by interpolation that in dilute sugar solutions an increase in the sugar-content of 1 per cent. at 18·5° C. corresponds to an increase of the viscosity of 0·00025. Utilizing these data, we find

$$P = 0{\cdot}49 \cdot 10^{-6} \text{ mm.}$$

and

$$N = 6{\cdot}56 \cdot 10^{23}. \quad . \quad . \quad (23), (28)$$

Berne, *January*, 1906.

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INVESTIGATIONS ON THE THEORY OF THE BROWNIAN MOVEMENT

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INVESTIGATIONS ON THE THEORY OF THE BROWNIAN MOVEMENT

I

ON THE MOVEMENT OF SMALL PARTICLES SUSPENDED IN A STATIONARY LIQUID DEMANDED BY THE MOLECULAR-KINETIC THEORY OF HEAT

IN this paper it will be shown that according to the molecular-kinetic theory of heat, bodies of microscopically-visible size suspended in a liquid will perform movements of such magnitude that they can be easily observed in a microscope, on account of the molecular motions of heat. It is possible that the movements to be discussed here are identical with the so-called "Brownian molecular motion"; however, the information available to me regarding the latter is so lacking in precision, that I can form no judgment in the matter (1).

If the movement discussed here can actually be observed (together with the laws relating to

it that one would expect to find), then classical thermodynamics can no longer be looked upon as applicable with precision to bodies even of dimensions distinguishable in a microscope: an exact determination of actual atomic dimensions is #en possible. On the other hand, had the prediction of this movement proved to be incorrect, a weighty argument would be provided against the molecular-kinetic conception of heat.

§ 1. On the Osmotic Pressure to be Ascribed to the Suspended Particles

Let z gram-molecules of a non-electrolyte be dissolved in a volume V^* forming part of a quantity of liquid of total volume V. If the volume V^* is separated from the pure solvent by a partition permeable for the solvent but impermeable for the solute, a so-called "osmotic pressure," p, is exerted on this partition, which satisfies the equation

$$pV^* = RTz \quad . \quad . \quad (2)$$

when V^*/z is sufficiently great.

On the other hand, if small suspended particles are present in the fractional volume V^* in place of the dissolved substance, which particles are also unable to pass through the partition permeable to the solvent: according to the classical theory of

thermodynamics—atleast when the force of gravity (which does not interest us here) is ignored—we would not expect to find any force acting on the partition; for according to ordinary conceptions the "free energy" of the system appears to be independent of the position of the partition and of the suspended particles, but dependent only on the total mass and qualities of the suspended material, the liquid and the partition, and on the pressure and temperature. Actually, for the calculation of the free energy the energy and entropy of the boundary-surface (surface-tension forces) should also be considered; these can be excluded if the size and condition of the surfaces of contact do not alter with the changes in position of the partition and of the suspended particles under consideration.

But a different conception is reached from the standpoint of the molecular-kinetic theory of heat. According to this theory a dissolved molecule is differentiated from a suspended body *solely* by its dimensions, and it is not apparent why a number of suspended particles should not produce the same osmotic pressure as the same number of molecules. We must assume that the suspended particles perform an irregular movement—even if a very slow one—in the liquid, on

account of the molecular movement of the liquid; if they are prevented from leaving the volume V^* by the partition, they will exert a pressure on the partition just like molecules in solution. Then, if there are n suspended particles present in the volume V^*, and therefore $n/V^* = \nu$ in a unit of volume, and if neighbouring particles are sufficiently far separated, there will be a corresponding osmotic pressure p of magnitude given by

$$p = \frac{RT}{V^*}\frac{n}{N} = \frac{RT}{N} \cdot \nu,$$

where N signifies the actual number of molecules contained in a gram-molecule. It will be shown in the next paragraph that the molecular-kinetic theory of heat actually leads to this wider conception of osmotic pressure.

§ 2. Osmotic Pressure from the Standpoint of the Molecular-Kinetic Theory of Heat (*)

If $p_1, p_2, \ldots p_l$ are the variables of state of

(*) In this paragraph the papers of the author on the "Foundations of Thermodynamics" are assumed to be familiar to the reader (*Ann. d. Phys.*, 9, p. 417, 1902; 11, p. 170, 1903). An understanding of the conclusions reached in the present paper is not dependent on a knowledge of the former papers or of this paragraph of the present paper.

a physical system which completely define the instantaneous condition of the system (for example, the Co-ordinates and velocity components of all atoms of the system), and if the complete system of the equations of change of these variables of state is given in the form

$$\frac{\partial p_\nu}{\partial t} = \phi_\nu(p_1 \ldots p_l) \; (\nu = 1, 2, \ldots l)$$

whence

$$\Sigma \frac{\partial \phi_\nu}{\partial p_\nu} = 0,$$

then the entropy of the system is given by the expression

$$S = \frac{\overline{E}}{T} + 2x \lg \int e^{-\frac{E}{2xT}} dp_1 \ldots dp_l \quad . \quad (3)$$

where T is the absolute temperature, $\overline{E}$ the energy of the system, E the energy as a function of p_ν. The integral is extended over all possible values of p_ν consistent with the conditions of the problem. x is connected with the constant N referred to before by the relation $2xN = R$. We obtain hence for the free energy F,

$$F = -\frac{R}{N} T \lg \int e^{-\frac{EN}{RT}} dp_1 \ldots dp_l = -\frac{RT}{N} \lg B.$$

Now let us consider a quantity of liquid enclosed in a volume V; let there be n solute molecules (or suspended particles respectively) in the portion V^* of this volume V, which are retained in the volume V^* by a semi-permeable partition; the integration limits of the integral B obtained in the expressions for S and F will be affected accordingly. The combined volume of the solute molecules (or suspended particles) is taken as small compared with V^*. This system will be completely defined according to the theory under discussion by the variables of condition $p_1 \ldots p_l$.

If the molecular picture were extended to deal with every single unit, the calculation of the integral B would offer such difficulties that an exact calculation of F could be scarcely contemplated. Accordingly, we need here only to know how F depends on the magnitude of the volume V^*, in which all the solute molecules, or suspended bodies (hereinafter termed briefly "particles") are contained.

We will call x_1, y_1, z_1 the rectangular Co-ordinates of the centre of gravity of the first particle, x_2, y_2, z_2 those of the second, etc., x_n, y_n, z_n those of the last particle, and allocate for the centres of gravity of the particles the indefinitely small domains of parallelopiped form dx_1, dy_1, dz_1; $dx_2, dy_2, dz_2, \ldots dx_n, dy_n, dz_n$, lying wholly within V^*. The value of the integral appearing in the expression for F will be sought, with the limitation that the centres of gravity of the particles lie within a domain defined in this manner. The integral can then be brought into the form

$$dB = dx_1\, dy_1 \ldots dz_n \cdot J,$$

where J is independent of dx_1, dy_1, etc., as well as of V^*, i.e. of the position of the semi-permeable partition. But J is also independent of any special choice of the position of the domains of the centres of gravity and of the magnitude of V^*, as will be shown immediately. For if a second system were given, of indefinitely small domains of the centres of gravity of the particles, and the latter designated $dx_1'dy_1'dz_1'$; $dx_2'dy_2'dz_2' \ldots dx_n'dy_n'dz_n'$, which domains differ from those originally given in their position but not in their magnitude, and are similarly all contained in V^*, an analogous expression holds:—

$$dB' = dx_1'dy_1' \ldots dz_n' \cdot J'.$$

Whence

$$dx_1dy_1 \ldots dz_n = dx_1'dy_1' \ldots dz_n'.$$

Therefore

$$\frac{dB}{dB'} = \frac{J}{J'}$$

But from the molecular theory of Heat given in the paper quoted,(*) it is easily deduced that dB/B (4) (or dB'/B respectively) is equal to the probability that at any arbitrary moment of time the centres of gravity of the particles are included in the domains $(dx_1 \ldots dz_n)$ or $(dx_1' \ldots dz_n')$ respectively. Now, if the movements of single particles are independent of one another to a sufficient degree of approximation, if the liquid is homogeneous and exerts no force on the particles, then for equal size of domains the probability of each of the two systems will be equal, so that the following holds:

$$\frac{dB}{B} = \frac{dB'}{B'}.$$

But from this and the last equation obtained it follows that

$$J = J'.$$

We have thus proved that J is independent both of V^* and of $x_1, y_1, \ldots z_n$. By integration we obtain

$$B = \int J dx_1 \ldots dz_n = J \cdot V^* n,$$

and thence

$$F = -\frac{RT}{N}\{lg\ J + n\ lg\ V^*\}$$

(*) A. Einstein, *Ann. d. Phys.*, **11**, p. 170, 1903.

and

$$p = -\frac{\partial F}{\partial V^*} = \frac{RT}{V^*}\frac{n}{N} = \frac{RT}{N}\nu.$$

It has been shown by this analysis that the existence of an osmotic pressure can be deduced from the molecular-kinetic theory of Heat; and that as far as osmotic pressure is concerned, solute molecules and suspended particles are, according to this theory, identical in their behaviour at great dilution.

§ 3. Theory of the Diffusion of Small Spheres in Suspension

Suppose there be suspended particles irregularly dispersed in a liquid. We will consider their state of dynamic equilibrium, on the assumption that a force K acts on the single particles, which force depends on the position, but not on the time. It will be assumed for the sake of simplicity that the force is exerted everywhere in the direction of the x axis.

Let ν be the number of suspended particles per unit volume; then in the condition of dynamic equilibrium ν is such a function of x that the variation of the free energy vanishes for an arbitrary virtual displacement δx of the suspended substance. We have, therefore,

$$\delta F = \delta E - T\delta S = 0.$$

It will be assumed that the liquid has unit area of cross-section perpendicular to the x axis and is bounded by the planes $x = 0$ and $x = l$. We have, then,

$$\delta E = -\int_0^l K\nu\delta x dx$$

and

$$\delta S = \int_0^l R\frac{\nu}{N}\frac{\partial\delta x}{\partial x}dx = -\frac{R}{N}\int_0^l \frac{\partial\nu}{\partial x}\delta x dx.$$

The required condition of equilibrium is therefore

$$-K\nu + \frac{RT}{N}\frac{\partial\nu}{\partial x} = 0 \qquad (1)$$

or

$$K\nu - \frac{\partial p}{\partial x} = 0 \quad . \qquad 5$$

The last equation states that equilibrium with the force K is brought about by osmotic pressure forces.

Equation (1) can be used to find the coefficient of diffusion of the suspended substance. We can look upon the dynamic equilibrium condition considered here as a superposition of two processes proceeding in opposite directions, namely:—

1. A movement of the suspended substance under the influence of the force K acting on each single suspended particle.

2. A process of diffusion, which is to be looked upon as a result of the irregular movement of the particles produced by the thermal molecular movement.

If the suspended particles have spherical form (radius of the sphere = P), and if the liquid has a coefficient of viscosity k, then the force K imparts to the single particles a velocity (*)

$$\frac{K}{6\pi kP} \quad . \quad . \quad . \quad (6)$$

and there will pass a unit area per unit of time

$$\frac{\nu K}{6\pi kP}$$

particles.

If, further, D signifies the coefficient of diffusion of the suspended substance, and μ the mass of a particle, as the result of diffusion there will pass across unit area in a unit of time,

$$-D\frac{\partial(\mu\nu)}{\partial x} \text{ grams}$$

or

$$-D\frac{\partial\nu}{\partial x} \text{ particles.}$$

(*) Cf. e.g. G. Kirchhoff, "Lectures on Mechanics," Lect. 26, § 4.

Since there must be dynamic equilibrium, we must have

$$\frac{\nu K}{6\pi k P} - D\frac{\partial \nu}{\partial x} = 0. \tag{2}$$

We can calculate the coefficient of diffusion from the two conditions (1) and (2) found for the dynamic equilibrium. We get

$$D = \frac{RT}{N}\frac{1}{6\pi k P} \quad . \tag{7}$$

The coefficient of diffusion of the suspended substance therefore depends (except for universal constants and the absolute temperature) only on the coefficient of viscosity of the liquid and on the size of the suspended particles.

§ 4. On the Irregular Movement of Particles Suspended in a Liquid and the Relation of this to Diffusion

We will turn now to a closer consideration of the irregular movements which arise from thermal molecular movement, and give rise to the diffusion investigated in the last paragraph.

Evidently it must be assumed that each single particle executes a movement which is independent of the movement of all other particles; the movements of one and the same particle after

different intervals of time must be considered as mutually independent processes, so long as we think of these intervals of time as being chosen not too small.

We will introduce a time-interval τ in our discussion, which is to be very small compared with the observed interval of time, but, nevertheless, of such a magnitude that the movements executed by a particle in two consecutive intervals of time τ are to be considered as mutually independent phenomena (8).

Suppose there are altogether n suspended particles in a liquid. In an interval of time τ the x-Co-ordinates of the single particles will increase by Δ, where Δ has a different value (positive or negative) for each particle. For the value of Δ a certain probability-law will hold; the number dn of the particles which experience in the time-interval τ a displacement which lies between Δ and $\Delta + d\Delta$, will be expressed by an equation of the form

$$dn = n\phi(\Delta)d\Delta,$$

where

$$\int_{-\infty}^{+\infty}\phi(\Delta)d\Delta = 1$$

and ϕ only differs from zero for very small values of Δ and fulfils the condition

$$\phi(\Delta) = \phi(-\Delta).$$

We will investigate now how the coefficient of diffusion depends on ϕ, confining ourselves again to the case when the number ν of the particles per unit volume is dependent only on x and t.

Putting for the number of particles per unit volume $\nu = f(x, t)$, we will calculate the distribution of the particles at a time $t + \tau$ from the distribution at the time t. From the definition of the function $+(A)$, there is easily obtained the number of the particles which are located at the time $t + \tau$ between two planes perpendicular to the x-axis, with abscissæ x and $x + dx$. We get

$$f(x, t + \tau)dx = dx. \int_{\Delta=-m}^{\Delta=+\infty} f(x + \Delta)\phi(\Delta)d\Delta.$$

Now, since τ is very small, we can put

$$f(x, t + \tau) = f(x, t) + \tau\frac{\partial f}{\partial t}.$$

Further, we can expand $f(x + \Delta, t)$ in powers of A :—

$$f(x+\Delta, t)=f(x, t)+\Delta\frac{\partial f(x, t)}{\partial x}+\frac{\Delta^2}{2!}\frac{\partial^2 f(x, t)}{\partial x^2} \ldots \textit{ad inf.}$$

We can bring this expansion under the integral sign, since only very small values of Δ contribute anything to the latter. We obtain

$$f+\frac{\partial f}{\partial t}\cdot\tau=f\int_{-\infty}^{+\infty}\phi(\Delta)d\Delta+\frac{\partial f}{\partial x}\int_{-\infty}^{+\infty}\Delta\phi(\Delta)d\Delta + \frac{\partial^2 f}{\partial x^2}\int_{-\infty}^{+\infty}\frac{\Delta^2}{2}\phi(\Delta)d\Delta \ldots$$

On the right-hand side the second, fourth, etc., terms vanish since $\phi(x) = \phi(-x)$; whilst of the first, third, fifth, etc., terms, every succeeding term is very small compared with the preceding. Bearing in mind that

$$\int_{-\infty}^{+\infty}\phi(\Delta)d\Delta = 1,$$

and putting

$$\frac{1}{\tau}\int_{-\infty}^{+\infty}\frac{\Delta^2}{2}\phi(\Delta)d\Delta = D,$$

and taking into consideration only the first and third terms on the right-hand side, we get from this equation

$$\frac{\partial f}{\partial t} = D\frac{\partial^2 f}{\partial x^2}. \tag{1}$$

This is the well-known differential equation for diffusion, and we recognise that D is the coefficient of diffusion.

Another important consideration can be related to this method of development. We have assumed that the single particles are all referred to the same Co-ordinate system. But this is unnecessary, since the movements of the single particles are mutually independent. We will now refer the motion of each particle to a co-ordinate

system whose origin coincides at the time $t = 0$ with the position of the centre of gravity of the particles in question; with this difference, that $f(x, t)dx$ now gives the number of the particles whose x Co-ordinate has increased between the time $t = 0$ and the time $t = t$, by a quantity which lies between x and $x + dx$. In this case also the function f must satisfy, in its changes, the equation (1). Further, we must evidently have for $x \gtrless 0$ and $t = 0$,

$$f(x, t) = 0 \text{ and } \int_{-\infty}^{+\infty} f(x, t)dx = n.$$

The problem, which accords with the problem of the diffusion outwards from a point (ignoring possibilities of exchange between the diffusing particles) is now mathematically completely defined (9); the solution is

$$f(x, t) = \frac{n}{\sqrt{4\pi D}} \frac{e^{-\frac{x^2}{4Dt}}}{\sqrt{t}} \quad . \quad . \quad (10)$$

The probable distribution of the resulting displacements in a given time t is therefore the same as that of fortuitous error, which was to be expected. But it is significant how the constants in the exponential term are related to the coefficient of diffusion. We will now calculate with the help

of this equation the displacement λ_x in the direction of the X-axis which a particle experiences on an average, or—more accurately expressed—the square root of the arithmetic mean of the squares of displacements in the direction of the X-axis; it is

$$\lambda_x = \sqrt{\overline{x^2}} = \sqrt{2Dt} \quad . \quad . \quad (11)$$

The mean displacement is therefore proportional to the square root of the time. It can easily be shown that the square root of the mean of the squares of the total displacements of the particles has the value $\lambda_x\sqrt{3}$ . . . (12)

§ 5. Formula for the Mean Displacement of Suspended Particles. A New Method of Determining the Real Size of the Atom

In § 3 we found for the coefficient of diffusion D of a material suspended in a liquid in the form of small spheres of radius P—

$$D = \frac{RT}{N} \cdot \frac{1}{6\pi kP}.$$

Further, we found in § 4 for the mean value of the displacement of the particles in the direction of the X-axis in time t—

$$\lambda_x = \sqrt{2Dt}.$$

By eliminating D we obtain

$$\lambda_x = \sqrt{t} \cdot \sqrt{\frac{RT}{N} \frac{1}{3\pi k P}}.$$

This equation shows how λ_x depends on T, k, and P.

We will calculate how great λ_x is for one second, if N is taken equal to $6 \cdot 10^{23}$ in accordance with the kinetic theory of gases, water at 17° C. is chosen as the liquid ($k = 1 \cdot 35 \cdot 10^{-2}$), and the diameter of the particles ·001 mm. We get

$$\lambda_x = 8 \cdot 10^{-5} \text{ cm.} = 0 \cdot 8\mu.$$

The mean displacement in one minute would be, therefore, about 6μ.

On the other hand, the relation found can be used for the determination of N. We obtain

$$N = \frac{1}{\lambda_x^2} \cdot \frac{RT}{3\pi k P}.$$

It is to be hoped that some enquirer may succeed shortly in solving the problem suggested here, which is so important in connection with the theory of Heat. (13)

Berne, *May*, 1905.

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II

ON THE THEORY OF THE BROWNIAN MOVEMENT

(From the *Annalen der Physik* (4), **19**, 1906, pp. 371-381)

SOON after the appearance of my paper (*) on the movements of particles suspended in liquids demanded by the molecular theory of heat, Siedentopf (of Jena) informed me that he and other physicists—in the first instance, Prof. Gouy (of Lyons)—had been convinced by direct observation that the so-called Brownian motion is caused by the irregular thermal movements of the molecules of the liquid.(†)

Not only the qualitative properties of the Brownian motion, but also the order of magnitude of the paths described by the particles correspond completely with the results of the theory. I will not attempt here a comparison of the slender experimental material at my disposal with the

(*) A. Einstein, *Ann. d. Phys.*, **17**, p. 549, 1905.
(†) M. Gouy, *Journ. de Phys.* (2), **7**, 561, 1888.

3. *Zur Elektrodynamik bewegter Körper; von A. Einstein.*

Daß die Elektrodynamik Maxwells — wie dieselbe gegenwärtig aufgefaßt zu werden pflegt — in ihrer Anwendung auf bewegte Körper zu Asymmetrien führt, welche den Phänomenen nicht anzuhaften scheinen, ist bekannt. Man denke z. B. an die elektrodynamische Wechselwirkung zwischen einem Magneten und einem Leiter. Das beobachtbare Phänomen hängt hier nur ab von der Relativbewegung von Leiter und Magnet, während nach der üblichen Auffassung die beiden Fälle, daß der eine oder der andere dieser Körper der bewegte sei, streng voneinander zu trennen sind. Bewegt sich nämlich der Magnet und ruht der Leiter, so entsteht in der Umgebung des Magneten ein elektrisches Feld von gewissem Energiewerte, welches an den Orten, wo sich Teile des Leiters befinden, einen Strom erzeugt. Ruht aber der Magnet und bewegt sich der Leiter, so entsteht in der Umgebung des Magneten kein elektrisches Feld, dagegen im Leiter eine elektromotorische Kraft, welcher an sich keine Energie entspricht, die aber — Gleichheit der Relativbewegung bei den beiden ins Auge gefaßten Fällen vorausgesetzt — zu elektrischen Strömen von derselben Größe und demselben Verlaufe Veranlassung gibt, wie im ersten Falle die elektrischen Kräfte.

Beispiele ähnlicher Art, sowie die mißlungenen Versuche, eine Bewegung der Erde relativ zum „Lichtmedium" zu konstatieren, führen zu der Vermutung, daß dem Begriffe der absoluten Ruhe nicht nur in der Mechanik, sondern auch in der Elektrodynamik keine Eigenschaften der Erscheinungen entsprechen, sondern daß vielmehr für alle Koordinatensysteme, für welche die mechanischen Gleichungen gelten, auch die gleichen elektrodynamischen und optischen Gesetze gelten, wie dies für die Größen erster Ordnung bereits erwiesen ist. Wir wollen diese Vermutung (deren Inhalt im folgenden „Prinzip der Relativität" genannt werden wird) zur Voraussetzung erheben und außerdem die mit ihm nur scheinbar unverträgliche

Voraussetzung einführen, daß sich das Licht im leeren Raume stets mit einer bestimmten, vom Bewegungszustande des emittierenden Körpers unabhängigen Geschwindigkeit V fortpflanze. Diese beiden Voraussetzungen genügen, um zu einer einfachen und widerspruchsfreien Elektrodynamik bewegter Körper zu gelangen unter Zugrundelegung der Maxwellschen Theorie für ruhende Körper. Die Einführung eines „Lichtäthers" wird sich insofern als überflüssig erweisen, als nach der zu entwickelnden Auffassung weder ein mit besonderen Eigenschaften ausgestatteter „absolut ruhender Raum" eingeführt, noch einem Punkte des leeren Raumes, in welchem elektromagnetische Prozesse stattfinden, ein Geschwindigkeitsvektor zugeordnet wird.

Die zu entwickelnde Theorie stützt sich — wie jede andere Elektrodynamik — auf die Kinematik des starren Körpers, da die Aussagen einer jeden Theorie Beziehungen zwischen starren Körpern (Koordinatensystemen), Uhren und elektromagnetischen Prozessen betreffen. Die nicht genügende Berücksichtigung dieses Umstandes ist die Wurzel der Schwierigkeiten, mit denen die Elektrodynamik bewegter Körper gegenwärtig zu kämpfen hat.

I. Kinematischer Teil.

§ 1. Definition der Gleichzeitigkeit.

Es liege ein Koordinatensystem vor, in welchem die Newtonschen mechanischen Gleichungen gelten. Wir nennen dies Koordinatensystem zur sprachlichen Unterscheidung von später einzuführenden Koordinatensystemen und zur Präzisierung der Vorstellung das „ruhende System".

Ruht ein materieller Punkt relativ zu diesem Koordinatensystem, so kann seine Lage relativ zu letzterem durch starre Maßstäbe unter Benutzung der Methoden der euklidischen Geometrie bestimmt und in kartesischen Koordinaten ausgedrückt werden.

Wollen wir die *Bewegung* eines materiellen Punktes beschreiben, so geben wir die Werte seiner Koordinaten in Funktion der Zeit. Es ist nun wohl im Auge zu behalten, daß eine derartige mathematische Beschreibung erst dann einen physikalischen Sinn hat, wenn man sich vorher darüber klar geworden ist, was hier unter „Zeit" verstanden wird.

Wir haben zu berücksichtigen, daß alle unsere Urteile, in welchen die Zeit eine Rolle spielt, immer Urteile über *gleichzeitige Ereignisse* sind. Wenn ich z. B. sage: „Jener Zug kommt hier um 7 Uhr an," so heißt dies etwa: „Das Zeigen des kleinen Zeigers meiner Uhr auf 7 und das Ankommen des Zuges sind gleichzeitige Ereignisse."[1])

Es könnte scheinen, daß alle die Definition der „Zeit" betreffenden Schwierigkeiten dadurch überwunden werden könnten, daß ich an Stelle der „Zeit" die „Stellung des kleinen Zeigers meiner Uhr" setze. Eine solche Definition genügt in der Tat, wenn es sich darum handelt, eine Zeit zu definieren ausschließlich für den Ort, an welchem sich die Uhr eben befindet; die Definition genügt aber nicht mehr, sobald es sich darum handelt, an verschiedenen Orten stattfindende Ereignisreihen miteinander zeitlich zu verknüpfen, oder — was auf dasselbe hinausläuft — Ereignisse zeitlich zu werten, welche in von der Uhr entfernten Orten stattfinden.

Wir könnten uns allerdings damit begnügen, die Ereignisse dadurch zeitlich zu werten, daß ein samt der Uhr im Koordinatenursprung befindlicher Beobachter jedem von einem zu wertenden Ereignis Zeugnis gebenden, durch den leeren Raum zu ihm gelangenden Lichtzeichen die entsprechende Uhrzeigerstellung zuordnet. Eine solche Zuordnung bringt aber den Übelstand mit sich, daß sie vom Standpunkte des mit der Uhr versehenen Beobachters nicht unabhängig ist, wie wir durch die Erfahrung wissen. Zu einer weit praktischeren Festsetzung gelangen wir durch folgende Betrachtung.

Befindet sich im Punkte A des Raumes eine Uhr, so kann ein in A befindlicher Beobachter die Ereignisse in der unmittelbaren Umgebung von A zeitlich werten durch Aufsuchen der mit diesen Ereignissen gleichzeitigen Uhrzeigerstellungen. Befindet sich auch im Punkte B des Raumes eine Uhr — wir wollen hinzufügen, „eine Uhr von genau derselben Beschaffenheit wie die in A befindliche" — so ist auch eine zeitliche Wertung der Ereignisse in der unmittelbaren Umgebung von

1) Die Ungenauigkeit, welche in dem Begriffe der Gleichzeitigkeit zweier Ereignisse an (annähernd) demselben Orte steckt und gleichfalls durch eine Abstraktion überbrückt werden muß, soll hier nicht erörtert werden.

B durch einen in B befindlichen Beobachter möglich. Es ist aber ohne weitere Festsetzung nicht möglich, ein Ereignis in A mit einem Ereignis in B zeitlich zu vergleichen; wir haben bisher nur eine „A-Zeit“ und eine „B-Zeit“, aber keine für A und B gemeinsame „Zeit“ definiert. Die letztere Zeit kann nun definiert werden, indem man *durch Definition* festsetzt, daß die „Zeit“, welche das Licht braucht, um von A nach B zu gelangen, gleich ist der „Zeit“, welche es braucht, um von B nach A zu gelangen. Es gehe nämlich ein Lichtstrahl zur „A-Zeit“ t_A von A nach B ab, werde zur „B-Zeit“ t_B in B gegen A zu reflektiert und gelange zur „A-Zeit“ t'_A nach A zurück. Die beiden Uhren laufen definitionsgemäß synchron, wenn

$$t_B - t_A = t'_A - t_B.$$

Wir nehmen an, daß diese Definition des Synchronismus in widerspruchsfreier Weise möglich sei, und zwar für beliebig viele Punkte, daß also allgemein die Beziehungen gelten:

1. Wenn die Uhr in B synchron mit der Uhr in A läuft, so läuft die Uhr in A synchron mit der Uhr in B.

2. Wenn die Uhr in A sowohl mit der Uhr in B als auch mit der Uhr in C synchron läuft, so laufen auch die Uhren in B und C synchron relativ zueinander.

Wir haben so unter Zuhilfenahme gewisser (gedachter) physikalischer Erfahrungen festgelegt, was unter synchron laufenden, an verschiedenen Orten befindlichen, ruhenden Uhren zu verstehen ist und damit offenbar eine Definition von „gleichzeitig“ und „Zeit“ gewonnen. Die „Zeit“ eines Ereignisses ist die mit dem Ereignis gleichzeitige Angabe einer am Orte des Ereignisses befindlichen, ruhenden Uhr, welche mit einer bestimmten, ruhenden Uhr, und zwar für alle Zeitbestimmungen mit der nämlichen Uhr, synchron läuft.

Wir setzen noch der Erfahrung gemäß fest, daß die Größe

$$\frac{2\,\overline{A\,B}}{t'_A - t_A} = V$$

eine universelle Konstante (die Lichtgeschwindigkeit im leeren Raume) sei.

Wesentlich ist, daß wir die Zeit mittels im ruhenden System

ruhender Uhren definiert haben; wir nennen die eben definierte Zeit wegen dieser Zugehörigkeit zum ruhenden System „die Zeit des ruhenden Systems".

§ 2. Über die Relativität von Längen und Zeiten.

Die folgenden Überlegungen stützen sich auf das Relativitätsprinzip und auf das Prinzip der Konstanz der Lichtgeschwindigkeit, welche beiden Prinzipien wir folgendermaßen definieren.

1. Die Gesetze, nach denen sich die Zustände der physikalischen Systeme ändern, sind unabhängig davon, auf welches von zwei relativ zueinander in gleichförmiger Translationsbewegung befindlichen Koordinatensystemen diese Zustandsänderungen bezogen werden.

2. Jeder Lichtstrahl bewegt sich im „ruhenden" Koordinatensystem mit der bestimmten Geschwindigkeit V, unabhängig davon, ob dieser Lichtstrahl von einem ruhenden oder bewegten Körper emittiert ist. Hierbei ist

$$\text{Geschwindigkeit} = \frac{\text{Lichtweg}}{\text{Zeitdauer}},$$

wobei „Zeitdauer" im Sinne der Definition des § 1 aufzufassen ist.

Es sei ein ruhender starrer Stab gegeben; derselbe besitze, mit einem ebenfalls ruhenden Maßstabe gemessen, die Länge l. Wir denken uns nun die Stabachse in die X-Achse des ruhenden Koordinatensystems gelegt und dem Stabe hierauf eine gleichförmige Paralleltranslationsbewegung (Geschwindigkeit v) längs der X-Achse im Sinne der wachsenden x erteilt. Wir fragen nun nach der Länge des *bewegten* Stabes, welche wir uns durch folgende zwei Operationen ermittelt denken:

a) Der Beobachter bewegt sich samt dem vorher genannten Maßstabe mit dem auszumessenden Stabe und mißt direkt durch Anlegen des Maßstabes die Länge des Stabes, ebenso, wie wenn sich auszumessender Stab, Beobachter und Maßstab in Ruhe befänden.

b) Der Beobachter ermittelt mittels im ruhenden Systeme aufgestellter, gemäß § 1 synchroner, ruhender Uhren, in welchen Punkten des ruhenden Systems sich Anfang und Ende des auszumessenden Stabes zu einer bestimmten Zeit t befinden.

Die Entfernung dieser beiden Punkte, gemessen mit dem schon benutzten, in diesem Falle ruhenden Maßstabe ist ebenfalls eine Länge, welche man als „Länge des Stabes" bezeichnen kann.

Nach dem Relativitätsprinzip muß die bei der Operation a) zu findende Länge, welche wir „die Länge des Stabes im bewegten System" nennen wollen, gleich der Länge l des ruhenden Stabes sein.

Die bei der Operation b) zu findende Länge, welche wir „die Länge des (bewegten) Stabes im ruhenden System" nennen wollen, werden wir unter Zugrundelegung unserer beiden Prinzipien bestimmen und finden, daß sie von l verschieden ist.

Die allgemein gebrauchte Kinematik nimmt stillschweigend an, daß die durch die beiden erwähnten Operationen bestimmten Längen einander genau gleich seien, oder mit anderen Worten, daß ein bewegter starrer Körper in der Zeitepoche t in geometrischer Beziehung vollständig durch *denselben* Körper, wenn er in bestimmter Lage *ruht,* ersetzbar sei.

Wir denken uns ferner an den beiden Stabenden (A und B) Uhren angebracht, welche mit den Uhren des ruhenden Systems synchron sind, d. h. deren Angaben jeweilen der „Zeit des ruhenden Systems" an den Orten, an welchen sie sich gerade befinden, entsprechen; diese Uhren sind also „synchron im ruhenden System".

Wir denken uns ferner, daß sich bei jeder Uhr ein mit ihr bewegter Beobachter befinde, und daß diese Beobachter auf die beiden Uhren das im § 1 aufgestellte Kriterium für den synchronen Gang zweier Uhren anwenden. Zur Zeit[1]) t_A gehe ein Lichtstrahl von A aus, werde zur Zeit t_B in B reflektiert und gelange zur Zeit t'_A nach A zurück. Unter Berücksichtigung des Prinzipes von der Konstanz der Lichtgeschwindigkeit finden wir:

$$t_B - t_A = \frac{r_{AB}}{V - v}$$

1) „Zeit" bedeutet hier „Zeit des ruhenden Systems" und zugleich „Zeigerstellung der bewegten Uhr, welche sich an dem Orte, von dem die Rede ist, befindet".

und

$$t'_A - t_B = \frac{r_{AB}}{V + v},$$

wobei r_{AB} die Länge des bewegten Stabes — im ruhenden System gemessen — bedeutet. Mit dem bewegten Stabe bewegte Beobachter würden also die beiden Uhren nicht synchron gehend finden, während im ruhenden System befindliche Beobachter die Uhren als synchron laufend erklären würden.

Wir sehen also, daß wir dem Begriffe der Gleichzeitigkeit keine *absolute* Bedeutung beimessen dürfen, sondern daß zwei Ereignisse, welche, von einem Koordinatensystem aus betrachtet, gleichzeitig sind, von einem relativ zu diesem System bewegten System aus betrachtet, nicht mehr als gleichzeitige Ereignisse aufzufassen sind.

§ 3. Theorie der Koordinaten- und Zeittransformation von dem ruhenden auf ein relativ zu diesem in gleichförmiger Translationsbewegung befindliches System.

Seien im „ruhenden" Raume zwei Koordinatensysteme, d. h. zwei Systeme von je drei von einem Punkte ausgehenden, aufeinander senkrechten starren materiellen Linien, gegeben. Die X-Achsen beider Systeme mögen zusammenfallen, ihre Y- und Z-Achsen bezüglich parallel sein. Jedem Systeme sei ein starrer Maßstab und eine Anzahl Uhren beigegeben, und es seien beide Maßstäbe sowie alle Uhren beider Systeme einander genau gleich.

Es werde nun dem Anfangspunkte des einen der beiden Systeme (k) eine (konstante) Geschwindigkeit v in Richtung der wachsenden x des anderen, ruhenden Systems (K) erteilt, welche sich auch den Koordinatenachsen, dem betreffenden Maßstabe sowie den Uhren mitteilen möge. Jeder Zeit t des ruhenden Systems K entspricht dann eine bestimmte Lage der Achsen des bewegten Systems und wir sind aus Symmetriegründen befugt anzunehmen, daß die Bewegung von k so beschaffen sein kann, daß die Achsen des bewegten Systems zur Zeit t (es ist mit „t" immer eine Zeit des ruhenden Systems bezeichnet) den Achsen des ruhenden Systems parallel seien.

Wir denken uns nun den Raum sowohl vom ruhenden System K aus mittels des ruhenden Maßstabes als auch vom

bewegten System k mittels des mit ihm bewegten Maßstabes ausgemessen und so die Koordinaten x, y, z bez. ξ, η, ζ ermittelt. Es werde ferner mittels der im ruhenden System befindlichen ruhenden Uhren durch Lichtsignale in der in § 1 angegebenen Weise die Zeit t des ruhenden Systems für alle Punkte des letzteren bestimmt, in denen sich Uhren befinden; ebenso werde die Zeit τ des bewegten Systems für alle Punkte des bewegten Systems, in welchen sich relativ zu letzterem ruhende Uhren befinden, bestimmt durch Anwendung der in § 1 genannten Methode der Lichtsignale zwischen den Punkten, in denen sich die letzteren Uhren befinden.

Zu jedem Wertsystem x, y, z, t, welches Ort und Zeit eines Ereignisses im ruhenden System vollkommen bestimmt, gehört ein jenes Ereignis relativ zum System k festlegendes Wertsystem ξ, η, ζ, τ, und es ist nun die Aufgabe zu lösen, das diese Größen verknüpfende Gleichungssystem zu finden.

Zunächst ist klar, daß die Gleichungen *linear* sein müssen wegen der Homogenitätseigenschaften, welche wir Raum und Zeit beilegen.

Setzen wir $x' = x - v\,t$, so ist klar, daß einem im System k ruhenden Punkte ein bestimmtes, von der Zeit unabhängiges Wertsystem x', y, z zukommt. Wir bestimmen zuerst τ als Funktion von x', y, z und t. Zu diesem Zwecke haben wir in Gleichungen auszudrücken, daß τ nichts anderes ist als der Inbegriff der Angaben von im System k ruhenden Uhren, welche nach der im § 1 gegebenen Regel synchron gemacht worden sind.

Vom Anfangspunkt des Systems k aus werde ein Lichtstrahl zur Zeit τ_0 längs der X-Achse nach x' gesandt und von dort zur Zeit τ_1 nach dem Koordinatenursprung reflektiert, wo er zur Zeit τ_2 anlange; so muß dann sein:

$$\tfrac{1}{2}(\tau_0 + \tau_2) = \tau_1$$

oder, indem man die Argumente der Funktion τ beifügt und das Prinzip der Konstanz der Lichtgeschwindigkeit im ruhenden Systeme anwendet:

$$\tfrac{1}{2}\left[\tau\,(0,0,0,t) + \tau\left(0,0,0,\left\{t + \frac{x'}{V-v} + \frac{x'}{V+v}\right\}\right)\right]$$
$$= \tau\left(x',0,0,t + \frac{x'}{V-v}\right).$$

Hieraus folgt, wenn man x' unendlich klein wählt:

$$\frac{1}{2}\left(\frac{1}{V-v}+\frac{1}{V+v}\right)\frac{\partial \tau}{\partial t}=\frac{\partial \tau}{\partial x'}+\frac{1}{V-v}\frac{\partial \tau}{\partial t},$$

oder

$$\frac{\partial \tau}{\partial x'}+\frac{v}{V^2-v^2}\frac{\partial \tau}{\partial t}=0.$$

Es ist zu bemerken, daß wir statt des Koordinatenursprunges jeden anderen Punkt als Ausgangspunkt des Lichtstrahles hätten wählen können und es gilt deshalb die eben erhaltene Gleichung für alle Werte von x', y, z.

Eine analoge Überlegung — auf die H- und Z-Achse angewandt — liefert, wenn man beachtet, daß sich das Licht längs dieser Achsen vom ruhenden System aus betrachtet stets mit der Geschwindigkeit $\sqrt{V^2-v^2}$ fortpflanzt:

$$\frac{\partial \tau}{\partial y}=0$$

$$\frac{\partial \tau}{\partial z}=0.$$

Aus diesen Gleichungen folgt, da τ eine *lineare* Funktion ist:

$$\tau=a\left(t-\frac{v}{V^2-v^2}x'\right),$$

wobei a eine vorläufig unbekannte Funktion $\varphi(v)$ ist und der Kürze halber angenommen ist, daß im Anfangspunkte von k für $\tau=0$ $t=0$ sei.

Mit Hilfe dieses Resultates ist es leicht, die Größen ξ, η, ζ zu ermitteln, indem man durch Gleichungen ausdrückt, daß sich das Licht (wie das Prinzip der Konstanz der Lichtgeschwindigkeit in Verbindung mit dem Relativitätsprinzip verlangt) auch im bewegten System gemessen mit der Geschwindigkeit V fortpflanzt. Für einen zur Zeit $\tau=0$ in Richtung der wachsenden ξ ausgesandten Lichtstrahl gilt:

$$\xi=V\tau,$$

oder

$$\xi=aV\left(t-\frac{v}{V^2-v^2}x'\right).$$

Nun bewegt sich aber der Lichtstrahl relativ zum Anfangs-

punkt von k im ruhenden System gemessen mit der Geschwindigkeit $V-v$, so daß gilt:

$$\frac{x'}{V-v} = t.$$

Setzen wir diesen Wert von t in die Gleichung für ξ ein, so erhalten wir:

$$\xi = a\frac{V^2}{V^2-v^2}x'.$$

Auf analoge Weise finden wir durch Betrachtung von längs den beiden anderen Achsen bewegte Lichtstrahlen:

$$\eta = V\tau = a\,V\left(t - \frac{v}{V^2-v^2}x'\right),$$

wobei

$$\frac{y}{\sqrt{V^2-v^2}} = t; \quad x' = 0;$$

also

$$\eta = a\frac{V}{\sqrt{V^2-v^2}}y$$

und

$$\zeta = a\frac{V}{\sqrt{V^2-v^2}}z.$$

Setzen wir für x' seinen Wert ein, so erhalten wir:

$$\begin{aligned}
\tau &= \varphi(v)\beta\left(t - \frac{v}{V^2}x\right),\\
\xi &= \varphi(v)\beta(x - v\,t),\\
\eta &= \varphi(v)y,\\
\zeta &= \varphi(v)z,
\end{aligned}$$

wobei

$$\beta = \frac{1}{\sqrt{1-\left(\frac{v}{V}\right)^2}}$$

und φ eine vorläufig unbekannte Funktion von v ist. Macht man über die Anfangslage des bewegten Systems und über den Nullpunkt von τ keinerlei Voraussetzung, so ist auf den rechten Seiten dieser Gleichungen je eine additive Konstante zuzufügen.

Wir haben nun zu beweisen, daß jeder Lichtstrahl sich, im bewegten System gemessen, mit der Geschwindigkeit V fortpflanzt, falls dies, wie wir angenommen haben, im ruhenden

System der Fall ist; denn wir haben den Beweis dafür noch nicht geliefert, daß das Prinzip der Konstanz der Lichtgeschwindigkeit mit dem Relativitätsprinzip vereinbar sei.

Zur Zeit $t = \tau = 0$ werde von dem zu dieser Zeit gemeinsamen Koordinatenursprung beider Systeme aus eine Kugelwelle ausgesandt, welche sich im System K mit der Geschwindigkeit V ausbreitet. Ist (x, y, z) ein eben von dieser Welle ergriffener Punkt, so ist also

$$x^2 + y^2 + z^2 = V^2 t^2 .$$

Diese Gleichung transformieren wir mit Hilfe unserer Transformationsgleichungen und erhalten nach einfacher Rechnung:

$$\xi^2 + \eta^2 + \zeta^2 = V^2 \tau^2 .$$

Die betrachtete Welle ist also auch im bewegten System betrachtet eine Kugelwelle von der Ausbreitungsgeschwindigkeit V. Hiermit ist gezeigt, daß unsere beiden Grundprinzipien miteinander vereinbar sind.

In den entwickelten Transformationsgleichungen tritt noch eine unbekannte Funktion φ von v auf, welche wir nun bestimmen wollen.

Wir führen zu diesem Zwecke noch ein drittes Koordinatensystem K' ein, welches relativ zum System k derart in Paralleltranslationsbewegung parallel zur Ξ-Achse begriffen sei, daß sich dessen Koordinatenursprung mit der Geschwindigkeit $-v$ auf der Ξ-Achse bewege. Zur Zeit $t = 0$ mögen alle drei Koordinatenanfangspunkte zusammenfallen und es sei für $t = x = y = z = 0$ die Zeit t' des Systems K' gleich Null. Wir nennen x', y', z' die Koordinaten, im System K' gemessen, und erhalten durch zweimalige Anwendung unserer Transformationsgleichungen:

$$\begin{aligned}
t' &= \varphi(-v)\beta(-v)\left\{\tau + \tfrac{v}{V^2}\xi\right\} &&= \varphi(v)\varphi(-v)t ,\\
x' &= \varphi(-v)\beta(-v)\{\xi + v\tau\} &&= \varphi(v)\varphi(-v)x ,\\
y' &= \varphi(-v)\eta &&= \varphi(v)\varphi(-v)y ,\\
z' &= \varphi(-v)\zeta &&= \varphi(v)\varphi(-v)z .
\end{aligned}$$

Da die Beziehungen zwischen x', y', z' und x, y, z die Zeit t nicht enthalten, so ruhen die Systeme K und K' gegeneinander,

und es ist klar, daß die Transformation von K auf K' die identische Transformation sein muß. Es ist also:

$$\varphi(v)\varphi(-v) = 1\,.$$

Wir fragen nun nach der Bedeutung von $\varphi(v)$. Wir fassen das Stück der H-Achse des Systems k ins Auge, das zwischen $\xi = 0$, $\eta = 0$, $\zeta = 0$ und $\xi = 0$, $\eta = l$, $\zeta = 0$ gelegen ist. Dieses Stück der H-Achse ist ein relativ zum System K mit der Geschwindigkeit v senkrecht zu seiner Achse bewegter Stab, dessen Enden in K die Koordinaten besitzen:

$$x_1 = v\,t, \quad y_1 = \frac{l}{\varphi(v)}, \quad z_1 = 0$$

und

$$x_2 = v\,t, \quad y_2 = 0, \qquad z_2 = 0\,.$$

Die Länge des Stabes, in K gemessen, ist also $l/\varphi(v)$; damit ist die Bedeutung der Funktion φ gegeben. Aus Symmetriegründen ist nun einleuchtend, daß die im ruhenden System gemessene Länge eines bestimmten Stabes, welcher senkrecht zu seiner Achse bewegt ist, nur von der Geschwindigkeit, nicht aber von der Richtung und dem Sinne der Bewegung abhängig sein kann. Es ändert sich also die im ruhenden System gemessene Länge des bewegten Stabes nicht, wenn v mit $-v$ vertauscht wird. Hieraus folgt:

$$\frac{l}{\varphi(v)} = \frac{l}{\varphi(-v)},$$

oder

$$\varphi(v) = \varphi(-v).$$

Aus dieser und der vorhin gefundenen Relation folgt, daß $\varphi(v) = 1$ sein muß, so daß die gefundenen Transformationsgleichungen übergehen in:

$$\tau = \beta\left(t - \frac{v}{V^2}x\right),$$

$$\xi = \beta(x - v\,t),$$

$$\eta = y,$$

$$\zeta = z,$$

wobei

$$\beta = \frac{1}{\sqrt{1 - \left(\frac{v}{V}\right)^2}},$$

§ 4. **Physikalische Bedeutung der erhaltenen Gleichungen, bewegte starre Körper und bewegte Uhren betreffend.**

Wir betrachten eine starre Kugel[1]) vom Radius R, welche relativ zum bewegten System k ruht, und deren Mittelpunkt im Koordinatenursprung von k liegt. Die Gleichung der Oberfläche dieser relativ zum System K mit der Geschwindigkeit v bewegten Kugel ist:

$$\xi^2 + \eta^2 + \zeta^2 = R^2 .$$

Die Gleichung dieser Oberfläche ist in x, y, z ausgedrückt zur Zeit $t = 0$:

$$\frac{x^2}{\left(\sqrt{1 - \left(\frac{v}{V}\right)^2}\right)^2} + y^2 + z^2 = R^2 .$$

Ein starrer Körper, welcher in ruhendem Zustande ausgemessen die Gestalt einer Kugel hat, hat also in bewegtem Zustande — vom ruhenden System aus betrachtet — die Gestalt eines Rotationsellipsoides mit den Achsen

$$R\sqrt{1 - \left(\frac{v}{V}\right)^2},\ R,\ R .$$

Während also die Y- und Z-Dimension der Kugel (also auch jedes starren Körpers von beliebiger Gestalt) durch die Bewegung nicht modifiziert erscheinen, erscheint die X-Dimension im Verhältnis $1 : \sqrt{1 - (v/V)^2}$ verkürzt, also um so stärker, je größer v ist. Für $v = V$ schrumpfen alle bewegten Objekte — vom „ruhenden" System aus betrachtet — in flächenhafte Gebilde zusammen. Für Überlichtgeschwindigkeiten werden unsere Überlegungen sinnlos; wir werden übrigens in den folgenden Betrachtungen finden, daß die Lichtgeschwindigkeit in unserer Theorie physikalisch die Rolle der unendlich großen Geschwindigkeiten spielt.

Es ist klar, daß die gleichen Resultate von im „ruhenden" System ruhenden Körpern gelten, welche von einem gleichförmig bewegten System aus betrachtet werden. —

Wir denken uns ferner eine der Uhren, welche relativ zum ruhenden System ruhend die Zeit t, relativ zum bewegten

1) Das heißt einen Körper, welcher ruhend untersucht Kugelgestalt besitzt.

System ruhend die Zeit τ anzugeben befähigt sind, im Koordinatenursprung von k gelegen und so gerichtet, daß sie die Zeit τ angibt. Wie schnell geht diese Uhr, vom ruhenden System aus betrachtet?

Zwischen die Größen x, t und τ, welche sich auf den Ort dieser Uhr beziehen, gelten offenbar die Gleichungen:

$$\tau = \frac{1}{\sqrt{1-\left(\frac{v}{V}\right)^2}}\left(t - \frac{v}{V^2}x\right)$$

und

$$x = v\,t.$$

Es ist also

$$\tau = t\sqrt{1-\left(\frac{v}{V}\right)^2} = t - \left(1 - \sqrt{1-\left(\frac{v}{V}\right)^2}\right)t,$$

woraus folgt, daß die Angabe der Uhr (im ruhenden System betrachtet) pro Sekunde um $\left(1-\sqrt{1-(v/V)^2}\right)$ Sek. oder — bis auf Größen vierter und höherer Ordnung um $\frac{1}{2}(v/V)^2$ Sek. zurückbleibt.

Hieraus ergibt sich folgende eigentümliche Konsequenz. Sind in den Punkten A und B von K ruhende, im ruhenden System betrachtet, synchron gehende Uhren vorhanden, und bewegt man die Uhr in A mit der Geschwindigkeit v auf der Verbindungslinie nach B, so gehen nach Ankunft dieser Uhr in B die beiden Uhren nicht mehr synchron, sondern die von A nach B bewegte Uhr geht gegenüber der von Anfang an in B befindlichen um $\frac{1}{2}tv^2/V^2$ Sek. (bis auf Größen vierter und höherer Ordnung) nach, wenn t die Zeit ist, welche die Uhr von A nach B braucht.

Man sieht sofort, daß dies Resultat auch dann noch gilt, wenn die Uhr in einer beliebigen polygonalen Linie sich von A nach B bewegt, und zwar auch dann, wenn die Punkte A und B zusammenfallen.

Nimmt man an, daß das für eine polygonale Linie bewiesene Resultat auch für eine stetig gekrümmte Kurve gelte, so erhält man den Satz: Befinden sich in A zwei synchron gehende Uhren und bewegt man die eine derselben auf einer geschlossenen Kurve mit konstanter Geschwindigkeit, bis sie wieder nach A zurückkommt, was t Sek. dauern möge, so geht die letztere Uhr bei ihrer Ankunft in A gegenüber der un-

bewegt gebliebenen um $\frac{1}{2} t (v/V)^2$ Sek. nach. Man schließt daraus, daß eine am Erdäquator befindliche Unruhuhr um einen sehr kleinen Betrag langsamer laufen muß als eine genau gleich beschaffene, sonst gleichen Bedingungen unterworfene, an einem Erdpole befindliche Uhr.

§ 5. Additionstheorem der Geschwindigkeiten.

In dem längs der X-Achse des Systems K mit der Geschwindigkeit v bewegten System k bewege sich ein Punkt gemäß den Gleichungen:

$$\xi = w_\xi \tau ,$$

$$\eta = w_\eta \tau ,$$

$$\zeta = 0 ,$$

wobei w_ξ und w_η Konstanten bedeuten.

Gesucht ist die Bewegung des Punktes relativ zum System K. Führt man in die Bewegungsgleichungen des Punktes mit Hilfe der in § 3 entwickelten Transformationsgleichungen die Größen x, y, z, t ein, so erhält man:

$$x = \frac{w_\xi + v}{1 + \frac{v w_\xi}{V^2}} t ,$$

$$y = \frac{\sqrt{1 - \left(\frac{v}{V}\right)^2}}{1 + \frac{v w_\xi}{V^2}} w_\eta t ,$$

$$z = 0 .$$

Das Gesetz vom Parallelogramm der Geschwindigkeiten gilt also nach unserer Theorie nur in erster Annäherung. Wir setzen:

$$U^2 = \left(\frac{dx}{dt}\right)^2 + \left(\frac{dy}{dt}\right)^2 ,$$

$$w^2 = w_\xi^2 + w_\eta^2$$

und

$$\alpha = \operatorname{arctg} \frac{w_y}{w_x} ;$$

α ist dann als der Winkel zwischen den Geschwindigkeiten v und w anzusehen. Nach einfacher Rechnung ergibt sich:

$$U = \frac{\sqrt{(v^2 + w^2 + 2\,v\,w\cos\alpha) - \left(\frac{v\,w\sin\alpha}{V}\right)^2}}{1 + \frac{v\,w\cos\alpha}{V^2}}.$$

Es ist bemerkenswert, daß v und w in symmetrischer Weise in den Ausdruck für die resultierende Geschwindigkeit eingehen. Hat auch w die Richtung der X-Achse (Ξ-Achse), so erhalten wir:

$$U = \frac{v + w}{1 + \frac{v\,w}{V^2}}.$$

Aus dieser Gleichung folgt, daß aus der Zusammensetzung zweier Geschwindigkeiten, welche kleiner sind als V, stets eine Geschwindigkeit kleiner als V resultiert. Setzt man nämlich $v = V - \varkappa$, $w = V - \lambda$, wobei $\varkappa$ und λ positiv und kleiner als V seien, so ist:

$$U = V\frac{2\,V - \varkappa - \lambda}{2\,V - \varkappa - \lambda + \frac{\varkappa\lambda}{V}} < V.$$

Es folgt ferner, daß die Lichtgeschwindigkeit V durch Zusammensetzung mit einer „Unterlichtgeschwindigkeit“ nicht geändert werden kann. Man erhält für diesen Fall:

$$U = \frac{V + w}{1 + \frac{w}{V}} = V.$$

Wir hätten die Formel für U für den Fall, daß v und w gleiche Richtung besitzen, auch durch Zusammensetzen zweier Transformationen gemäß § 3 erhalten können. Führen wir neben den in § 3 figurierenden Systemen K und k noch ein drittes, zu k in Parallelbewegung begriffenes Koordinatensystem k' ein, dessen Anfangspunkt sich auf der Ξ-Achse mit der Geschwindigkeit w bewegt, so erhalten wir zwischen den Größen x, y, z, t und den entsprechenden Größen von k' Gleichungen, welche sich von den in § 3 gefundenen nur dadurch unterscheiden, daß an Stelle von „v“ die Größe

$$\frac{v + w}{1 + \frac{v\,w}{V^2}}$$

tritt; man sieht daraus, daß solche Paralleltransformationen — wie dies sein muß — eine Gruppe bilden.

Wir haben nun die für uns notwendigen Sätze der unseren zwei Prinzipien entsprechenden Kinematik hergeleitet und gehen dazu über, deren Anwendung in der Elektrodynamik zu zeigen.

II. Eektrodynamischer Teil.

§ 6. Transformation der Maxwell-Hertzschen Gleichungen für den leeren Raum. Über die Natur der bei Bewegung in einem Magnetfeld auftretenden elektromotorischen Kräfte.

Die Maxwell-Hertzschen Gleichungen für den leeren Raum mögen gültig sein für das ruhende System K, so daß gelten möge:

$$\frac{1}{V}\frac{\partial X}{\partial t} = \frac{\partial N}{\partial y} - \frac{\partial M}{\partial z}, \quad \frac{1}{V}\frac{\partial L}{\partial t} = \frac{\partial Y}{\partial z} - \frac{\partial Z}{\partial y},$$

$$\frac{1}{V}\frac{\partial Y}{\partial t} = \frac{\partial L}{\partial z} - \frac{\partial N}{\partial x}, \quad \frac{1}{V}\frac{\partial M}{\partial t} = \frac{\partial Z}{\partial x} - \frac{\partial X}{\partial z},$$

$$\frac{1}{V}\frac{\partial Z}{\partial t} = \frac{\partial M}{\partial x} - \frac{\partial L}{\partial y}, \quad \frac{1}{V}\frac{\partial N}{\partial t} = \frac{\partial X}{\partial y} - \frac{\partial Y}{\partial x},$$

wobei (X, Y, Z) den Vektor der elektrischen, (L, M, N) den der magnetischen Kraft bedeutet.

Wenden wir auf diese Gleichungen die in § 3 entwickelte Transformation an, indem wir die elektromagnetischen Vorgänge auf das dort eingeführte, mit der Geschwindigkeit v bewegte Koordinatensystem beziehen, so erhalten wir die Gleichungen:

$$\frac{1}{V}\frac{\partial X}{\partial \tau} = \frac{\partial \beta\left(N - \frac{v}{V}Y\right)}{\partial \eta} - \frac{\partial \beta\left(M + \frac{v}{V}Z\right)}{\partial \zeta},$$

$$\frac{1}{V}\frac{\partial \beta\left(Y - \frac{v}{V}N\right)}{\partial \tau} = \frac{\partial L}{\partial \zeta} - \frac{\partial \beta\left(N - \frac{v}{V}Y\right)}{\partial \xi},$$

$$\frac{1}{V}\frac{\partial \beta\left(Z + \frac{v}{V}M\right)}{\partial \tau} = \frac{\partial \beta\left(M + \frac{v}{V}Z\right)}{\partial \xi} - \frac{\partial L}{\partial \eta},$$

$$\frac{1}{V}\frac{\partial L}{\partial \tau} = \frac{\partial \beta\left(Y - \frac{v}{V}N\right)}{\partial \zeta} - \frac{\partial \beta\left(Z + \frac{v}{V}M\right)}{\partial \eta},$$

$$\frac{1}{V}\frac{\partial\beta\left(M+\frac{v}{V}Z\right)}{\partial\tau}=\frac{\partial\beta\left(Z+\frac{v}{V}M\right)}{\partial\xi}-\frac{\partial X}{\partial\zeta},$$

$$\frac{1}{V}\frac{\partial\beta\left(N-\frac{v}{V}Y\right)}{\partial\tau}=\frac{\partial X}{\partial\eta}-\frac{\partial\beta\left(Y-\frac{v}{V}N\right)}{\partial\xi},$$

wobei

$$\beta=\frac{1}{\sqrt{1-\left(\frac{v}{V}\right)^2}}.$$

Das Relativitätsprinzip fordert nun, daß die Maxwell-Hertzschen Gleichungen für den leeren Raum auch im System k gelten, wenn sie im System K gelten, d. h. daß für die im bewegten System k durch ihre ponderomotorischen Wirkungen auf elektrische bez. magnetische Massen definierten Vektoren der elektrischen und magnetischen Kraft ($(X', Y' Z')$ und (L', M', N')) des bewegten Systems k die Gleichungen gelten:

$$\frac{1}{V}\frac{\partial X'}{\partial\tau}=\frac{\partial N'}{\partial\eta}-\frac{\partial M'}{\partial\zeta},\quad \frac{1}{V}\frac{\partial L'}{\partial\tau}=\frac{\partial Y'}{\partial\zeta}-\frac{\partial Z'}{\partial\eta},$$

$$\frac{1}{V}\frac{\partial Y'}{\partial\tau}=\frac{\partial L'}{\partial\zeta}-\frac{\partial N'}{\partial\xi},\quad \frac{1}{V}\frac{\partial M'}{\partial\tau}=\frac{\partial Z'}{\partial\xi}-\frac{\partial X'}{\partial\zeta},$$

$$\frac{1}{V}\frac{\partial Z'}{\partial\tau}=\frac{\partial M'}{\partial\xi}-\frac{\partial L'}{\partial\eta},\quad \frac{1}{V}\frac{\partial N'}{\partial\tau}=\frac{\partial X'}{\partial\eta}-\frac{\partial Y'}{\partial\xi}.$$

Offenbar müssen nun die beiden für das System k gefundenen Gleichungssysteme genau dasselbe ausdrücken, da beide Gleichungssysteme den Maxwell-Hertzschen Gleichungen für das System K äquivalent sind. Da die Gleichungen beider Systeme ferner bis auf die die Vektoren darstellenden Symbole übereinstimmen, so folgt, daß die in den Gleichungssystemen an entsprechenden Stellen auftretenden Funktionen bis auf einen für alle Funktionen des einen Gleichungssystems gemeinsamen, von ξ, η, ζ und τ unabhängigen, eventuell von v abhängigen Faktor $\psi(v)$ übereinstimmen müssen. Es gelten also die Beziehungen:

$$X'=\psi(v)X,\qquad L'=\psi(v)L,$$

$$Y'=\psi(v)\beta\left(Y-\frac{v}{V}N\right),\qquad M'=\psi(v)\beta\left(M+\frac{v}{V}Z\right),$$

$$Z'=\psi(v)\beta\left(Z+\frac{v}{V}M\right),\qquad N'=\psi(v)\beta\left(N-\frac{v}{V}Y\right).$$

Bildet man nun die Umkehrung dieses Gleichungssystems, erstens durch Auflösen der soeben erhaltenen Gleichungen, zweitens durch Anwendung der Gleichungen auf die inverse Transformation (von k auf K), welche durch die Geschwindigkeit $-v$ charakterisiert ist, so folgt, indem man berücksichtigt, daß die beiden so erhaltenen Gleichungssysteme identisch sein müssen:

$$\varphi(v) \cdot \varphi(-v) = 1 .$$

Ferner folgt aus Symmetriegründen[1])

$$\varphi(v) = \varphi(-v);$$

es ist also

$$\varphi(v) = 1 ,$$

und unsere Gleichungen nehmen die Form an:

$$X' = X, \qquad L' = L,$$

$$Y' = \beta\left(Y - \frac{v}{V} N\right), \qquad M' = \beta\left(M + \frac{v}{V} Z\right),$$

$$Z' = \beta\left(Z + \frac{v}{V} M\right), \qquad N' = \beta\left(N - \frac{v}{V} Y\right).$$

Zur Interpretation dieser Gleichungen bemerken wir folgendes. Es liegt eine punktförmige Elektrizitätsmenge vor, welche im ruhenden System K gemessen von der Größe „eins" sei, d. h. im ruhenden System ruhend auf eine gleiche Elektrizitätsmenge im Abstand 1 cm die Kraft 1 Dyn ausübe. Nach dem Relativitätsprinzip ist diese elektrische Masse auch im bewegten System gemessen von der Größe „eins". Ruht diese Elektrizitätsmenge relativ zum ruhenden System, so ist definitionsgemäß der Vektor (X, Y, Z) gleich der auf sie wirkenden Kraft. Ruht die Elektrizitätsmenge gegenüber dem bewegten System (wenigstens in dem betreffenden Augenblick), so ist die auf sie wirkende, in dem bewegten System gemessene Kraft gleich dem Vektor (X', Y', Z'). Die ersten drei der obigen Gleichungen lassen sich mithin auf folgende zwei Weisen in Worte kleiden:

1. Ist ein punktförmiger elektrischer Einheitspol in einem elektromagnetischen Felde bewegt, so wirkt auf ihn außer der

1) Ist z. B. $X = Y = Z = L = M = 0$ und $N \neq 0$, so ist aus Symmetriegründen klar, daß bei Zeichenwechsel von v ohne Änderung des numerischen Wertes auch Y' sein Vorzeichen ändern muß, ohne seinen numerischen Wert zu ändern.

elektrischen Kraft eine „elektromotorische Kraft", welche unter Vernachlässigung von mit der zweiten und höheren Potenzen von v/V multiplizierten Gliedern gleich ist dem mit der Lichtgeschwindigkeit dividierten Vektorprodukt der Bewegungsgeschwindigkeit des Einheitspoles und der magnetischen Kraft. (Alte Ausdrucksweise.)

2. Ist ein punktförmiger elektrischer Einheitspol in einem elektromagnetischen Felde bewegt, so ist die auf ihn wirkende Kraft gleich der an dem Orte des Einheitspoles vorhandenen elektrischen Kraft, welche man durch Transformation des Feldes auf ein relativ zum elektrischen Einheitspol ruhendes Koordinatensystem erhält. (Neue Ausdrucksweise.)

Analoges gilt über die „magnetomotorischen Kräfte". Man sieht, daß in der entwickelten Theorie die elektromotorische Kraft nur die Rolle eines Hilfsbegriffes spielt, welcher seine Einführung dem Umstande verdankt, daß die elektrischen und magnetischen Kräfte keine von dem Bewegungszustande des Koordinatensystems unabhängige Existenz besitzen.

Es ist ferner klar, daß die in der Einleitung angeführte Asymmetrie bei der Betrachtung der durch Relativbewegung eines Magneten und eines Leiters erzeugten Ströme verschwindet. Auch werden die Fragen nach dem „Sitz" der elektrodynamischen elektromotorischen Kräfte (Unipolarmaschinen) gegenstandslos.

§ 7. Theorie des Doppelerschen Prinzips und der Aberration.

Im Systeme K befinde sich sehr ferne vom Koordinatenursprung eine Quelle elektrodynamischer Wellen, welche in einem den Koordinatenursprung enthaltenden Raumteil mit genügender Annäherung durch die Gleichungen dargestellt sei:

$$\begin{aligned} X &= X_0 \sin \Phi, \quad L = L_0 \sin \Phi, \\ Y &= Y_0 \sin \Phi, \quad M = M_0 \sin \Phi, \quad \Phi = \omega\left(t - \frac{a\,x + b\,y + c\,z}{V}\right). \\ Z &= Z_0 \sin \Phi, \quad N = N_0 \sin \Phi, \end{aligned}$$

Hierbei sind (X_0, Y_0, Z_0) und (L_0, M_0, N_0) die Vektoren, welche die Amplitude des Wellenzuges bestimmen, a, b, c die Richtungskosinus der Wellennormalen.

Wir fragen nach der Beschaffenheit dieser Wellen, wenn dieselben von einem in dem bewegten System k ruhenden

Beobachter untersucht werden. — Durch Anwendung der in § 6 gefundenen Transformationsgleichungen für die elektrischen und magnetischen Kräfte und der in § 3 gefundenen Transformationsgleichungen für die Koordinaten und die Zeit erhalten wir unmittelbar:

$$X' = X_0 \sin \Phi', \qquad L' = L_0 \sin \Phi',$$

$$Y' = \beta\left(Y_0 - \frac{v}{V} N_0\right) \sin \Phi', \qquad M' = \beta\left(M_0 + \frac{v}{V} Z_0\right) \sin \Phi',$$

$$Z' = \beta\left(Z_0 + \frac{v}{V} M_0\right) \sin \Phi', \qquad N' = \beta\left(N_0 - \frac{v}{V} Y_0\right) \sin \Phi',$$

$$\Phi' = \omega'\left(\tau - \frac{a'\xi + b'\eta + c'\zeta}{V}\right),$$

wobei

$$\omega' = \omega\beta\left(1 - a\frac{v}{V}\right),$$

$$a' = \frac{a - \frac{v}{V}}{1 - a\frac{v}{V}},$$

$$b' = \frac{b}{\beta\left(1 - a\frac{v}{V}\right)},$$

$$c' = \frac{c}{\beta\left(1 - a\frac{v}{V}\right)}$$

gesetzt ist.

Aus der Gleichung für ω' folgt: Ist ein Beobachter relativ zu einer unendlich fernen Lichtquelle von der Frequenz ν mit der Geschwindigkeit v derart bewegt, daß die Verbindungslinie „Lichtquelle–Beobachter" mit der auf ein relativ zur Lichtquelle ruhendes Koordinatensystem bezogenen Geschwindigkeit des Beobachters den Winkel φ bildet, so ist die von dem Beobachter wahrgenommene Frequenz ν' des Lichtes durch die Gleichung gegeben:

$$\nu' = \nu \frac{1 - \cos\varphi \frac{v}{V}}{\sqrt{1 - \left(\frac{v}{V}\right)^2}}.$$

Dies ist das Doppelersche Prinzip für beliebige Geschwindig-

keiten. Für $\varphi = 0$ nimmt die Gleichung die übersichtliche Form an:

$$\nu' = \nu \sqrt{\frac{1 - \frac{v}{V}}{1 + \frac{v}{V}}}.$$

Man sieht, daß — im Gegensatz zu der üblichen Auffassung — für $v = -\infty$, $v = \infty$ ist.

Nennt man φ' den Winkel zwischen Wellennormale (Strahlrichtung) im bewegten System und der Verbindungslinie „Lichtquelle–Beobachter", so nimmt die Gleichung für a' die Form an:

$$\cos\varphi' = \frac{\cos\varphi - \frac{v}{V}}{1 - \frac{v}{V}\cos\varphi}.$$

Diese Gleichung drückt das Aberrationsgesetz in seiner allgemeinsten Form aus. Ist $\varphi = \pi/2$, so nimmt die Gleichung die einfache Gestalt an:

$$\cos\varphi' = -\frac{v}{V}.$$

Wir haben nun noch die Amplitude der Wellen, wie dieselbe im bewegten System erscheint, zu suchen. Nennt man A bez. A' die Amplitude der elektrischen oder magnetischen Kraft im ruhenden bez. im bewegten System gemessen, so erhält man:

$$A'^2 = A^2 \frac{\left(1 - \frac{v}{V}\cos\varphi\right)^2}{1 - \left(\frac{v}{V}\right)^2},$$

welche Gleichung für $\varphi = 0$ in die einfachere übergeht:

$$A'^2 = A^2 \frac{1 - \frac{v}{V}}{1 + \frac{v}{V}}.$$

Es folgt aus den entwickelten Gleichungen, daß für einen Beobachter, der sich mit der Geschwindigkeit V einer Lichtquelle näherte, diese Lichtquelle unendlich intensiv erscheinen müßte.

§ 8. **Transformation der Energie der Lichtstrahlen. Theorie des auf vollkommene Spiegel ausgeübten Strahlungsdruckes.**

Da $A^2/8\pi$ gleich der Lichtenergie pro Volumeneinheit ist, so haben wir nach dem Relativitätsprinzip $A'^2/8\pi$ als die Lichtenergie im bewegten System zu betrachten. Es wäre daher A'^2/A^2 das Verhältnis der „bewegt gemessenen" und „ruhend gemessenen" Energie eines bestimmten Lichtkomplexes, wenn das Volumen eines Lichtkomplexes in K gemessen und in k gemessen das gleiche wäre. Dies ist jedoch nicht der Fall. Sind a, b, c die Richtungskosinus der Wellennormalen des Lichtes im ruhenden System, so wandert durch die Oberflächenelemente der mit Lichtgeschwindigkeit bewegten Kugelfläche

$$(x - Vat)^2 + (y - Vbt)^2 + (z - Vct)^2 = R^2$$

keine Energie hindurch; wir können daher sagen, daß diese Fläche dauernd denselben Lichtkomplex umschließt. Wir fragen nach der Energiemenge, welche diese Fläche im System k betrachtet umschließt, d. h. nach der Energie des Lichtkomplexes relativ zum System k.

Die Kugelfläche ist — im bewegten System betrachtet — eine Ellipsoidfläche, welche zur Zeit $\tau = 0$ die Gleichung besitzt:

$$\left(\beta\xi - a\beta\frac{v}{V}\xi\right)^2 + \left(\eta - b\beta\frac{v}{V}\xi\right)^2 + \left(\zeta - c\beta\frac{v}{V}\xi\right)^2 = R^2.$$

Nennt man S das Volumen der Kugel, S' dasjenige dieses Ellipsoides, so ist, wie eine einfache Rechnung zeigt:

$$\frac{S'}{S} = \frac{\sqrt{1 - \left(\frac{v}{V}\right)^2}}{1 - \frac{v}{V}\cos\varphi}.$$

Nennt man also E die im ruhenden System gemessene, E' die im bewegten System gemessene Lichtenergie, welche von der betrachteten Fläche umschlossen wird, so erhält man:

$$\frac{E'}{E} = \frac{\frac{A'^2}{8\pi}S'}{\frac{A^2}{8\pi}S} = \frac{1 - \frac{v}{V}\cos\varphi}{\sqrt{1 - \left(\frac{v}{V}\right)^2}},$$

welche Formel für $\varphi = 0$ in die einfachere übergeht:

$$\frac{E'}{E} = \sqrt{\frac{1 - \frac{v}{V}}{1 + \frac{v}{V}}}.$$

Es ist bemerkenswert, daß die Energie und die Frequenz eines Lichtkomplexes sich nach demselben Gesetze mit dem Bewegungszustande des Beobachters ändern.

Es sei nun die Koordinatenebene $\xi = 0$ eine vollkommen spiegelnde Fläche, an welcher die im letzten Paragraph betrachteten ebenen Wellen reflektiert werden. Wir fragen nach dem auf die spiegelnde Fläche ausgeübten Lichtdruck und nach der Richtung, Frequenz und Intensität des Lichtes nach der Reflexion.

Das einfallende Licht sei durch die Größen A, $\cos\varphi$, v (auf das System K bezogen) definiert. Von k aus betrachtet sind die entsprechenden Größen:

$$A' = A \frac{1 - \frac{v}{V}\cos\varphi}{\sqrt{1 - \left(\frac{v}{V}\right)^2}},$$

$$\cos\varphi' = \frac{\cos\varphi - \frac{v}{V}}{1 - \frac{v}{V}\cos\varphi},$$

$$v' = v \frac{1 - \frac{v}{V}\cos\varphi}{\sqrt{1 - \left(\frac{v}{V}\right)^2}}.$$

Für das reflektierte Licht erhalten wir, wenn wir den Vorgang auf das System k beziehen:

$$A'' = A',$$

$$\cos\varphi'' = -\cos\varphi',$$

$$v'' = v'.$$

Endlich erhält man durch Rücktransformieren aufs ruhende System K für das reflektierte Licht:

$$A''' = A'' \frac{1 + \frac{v}{V}\cos\varphi''}{\sqrt{1 - \left(\frac{v}{V}\right)^2}} = A \frac{1 - 2\frac{v}{V}\cos\varphi + \left(\frac{v}{V}\right)^2}{1 - \left(\frac{v}{V}\right)^2},$$

$$\cos\varphi''' = \frac{\cos\varphi'' + \frac{v}{V}}{1 + \frac{v}{V}\cos\varphi''} = -\frac{\left(1 + \left(\frac{v}{V}\right)^2\right)\cos\varphi - 2\frac{v}{V}}{1 - 2\frac{v}{V}\cos\varphi + \left(\frac{v}{V}\right)^2},$$

$$\nu''' = \nu'' \frac{1 + \frac{v}{V}\cos\varphi''}{\sqrt{1 - \left(\frac{v}{V}\right)^2}} = \nu \frac{1 - 2\frac{v}{V}\cos\varphi + \left(\frac{v}{V}\right)^2}{\left(1 - \frac{v}{V}\right)^2}.$$

Die auf die Flächeneinheit des Spiegels pro Zeiteinheit auftreffende (im ruhenden System gemessene) Energie ist offenbar $A^2/8\pi\,(V\cos\varphi - v)$. Die von der Flächeneinheit des Spiegels in der Zeiteinheit sich entfernende Energie ist $A'''^2/8\pi\,(-V\cos\varphi''' + v)$. Die Differenz dieser beiden Ausdrücke ist nach dem Energieprinzip die vom Lichtdrucke in der Zeiteinheit geleistete Arbeit. Setzt man die letztere gleich dem Produkt $P.v$, wobei P der Lichtdruck ist, so erhält man:

$$P = 2\frac{A^2}{8\pi}\frac{\left(\cos\varphi - \frac{v}{V}\right)^2}{1 - \left(\frac{v}{V}\right)^2}.$$

In erster Annäherung erhält man in Übereinstimmung mit der Erfahrung und mit anderen Theorien

$$P = 2\frac{A^2}{8\pi}\cos^2\varphi.$$

Nach der hier benutzten Methode können alle Probleme der Optik bewegter Körper gelöst werden. Das Wesentliche ist, daß die elektrische und magnetische Kraft des Lichtes, welches durch einen bewegten Körper beeinflußt wird, auf ein relativ zu dem Körper ruhendes Koordinatensystem transformiert werden. Dadurch wird jedes Problem der Optik bewegter Körper auf eine Reihe von Problemen der Optik ruhender Körper zurückgeführt.

§ 9. **Transformation der Maxwell-Hertzschen Gleichungen mit Berücksichtigung der Konvektionsströme.**

Wir gehen aus von den Gleichungen:

$$\frac{1}{V}\left\{u_x \varrho + \frac{\partial X}{\partial t}\right\} = \frac{\partial N}{\partial y} - \frac{\partial M}{\partial z}, \quad \frac{1}{V}\frac{\partial L}{\partial t} = \frac{\partial Y}{\partial z} - \frac{\partial Z}{\partial y},$$

$$\frac{1}{V}\left\{u_y \varrho + \frac{\partial Y}{\partial t}\right\} = \frac{\partial L}{\partial z} - \frac{\partial N}{\partial x}, \quad \frac{1}{V}\frac{\partial M}{\partial t} = \frac{\partial Z}{\partial x} - \frac{\partial X}{\partial z},$$

$$\frac{1}{V}\left\{u_z \varrho + \frac{\partial Z}{\partial t}\right\} = \frac{\partial M}{\partial x} - \frac{\partial L}{\partial y}, \quad \frac{1}{V}\frac{\partial N}{\partial t} = \frac{\partial X}{\partial y} - \frac{\partial Y}{\partial x},$$

wobei

$$\varrho = \frac{\partial X}{\partial x} + \frac{\partial Y}{\partial y} + \frac{\partial Z}{\partial z}$$

die 4π-fache Dichte der Elektrizität und (u_x, u_y, u_z) den Geschwindigkeitsvektor der Elektrizität bedeutet. Denkt man sich die elektrischen Massen unveränderlich an kleine, starre Körper (Ionen, Elektronen) gebunden, so sind diese Gleichungen die elektromagnetische Grundlage der Lorentzschen Elektrodynamik und Optik bewegter Körper.

Transformiert man diese Gleichungen, welche im System K gelten mögen, mit Hilfe der Transformationsgleichungen von § 3 und § 6 auf das System k, so erhält man die Gleichungen:

$$\frac{1}{V}\left\{u_\xi \varrho' + \frac{\partial X'}{\partial \tau}\right\} = \frac{\partial N'}{\partial \eta} - \frac{\partial M'}{\partial \zeta}, \quad \frac{\partial L'}{\partial \tau} = \frac{\partial Y'}{\partial \zeta} - \frac{\partial Z'}{\partial \eta},$$

$$\frac{1}{V}\left\{u_\eta \varrho' + \frac{\partial Y'}{\partial \tau}\right\} = \frac{\partial L'}{\partial \zeta} - \frac{\partial N'}{\partial \xi}, \quad \frac{\partial M'}{\partial \tau} = \frac{\partial Z'}{\partial \xi} - \frac{\partial X'}{\partial \zeta},$$

$$\frac{1}{V}\left\{u_\zeta \varrho' + \frac{\partial Z'}{\partial \tau}\right\} = \frac{\partial M'}{\partial \xi} - \frac{\partial L'}{\partial \eta}, \quad \frac{\partial N'}{\partial \tau} = \frac{\partial X'}{\partial \eta} - \frac{\partial Y'}{\partial \xi},$$

wobei

$$\frac{u_x - v}{1 - \frac{u_x v}{V^2}} = u_\xi,$$

$$\frac{u_y}{\beta\left(1 - \frac{u_x v}{V^2}\right)} = u_\eta, \quad \varrho' = \frac{\partial X'}{\partial \xi} + \frac{\partial Y'}{\partial \eta} + \frac{\partial Z'}{\partial \zeta} = \beta\left(1 - \frac{v u_x}{V^2}\right)\varrho.$$

$$\frac{u_z}{\beta\left(1 - \frac{u_x v}{V^2}\right)} = u_\zeta.$$

Da — wie aus dem Additionstheorem der Geschwindigkeiten (§ 5) folgt — der Vektor (u_ξ, u_η, u_ζ) nichts anderes ist als die Geschwindigkeit der elektrischen Massen im System k gemessen, so ist damit gezeigt, daß unter Zugrundelegung unserer kinematischen Prinzipien die elektrodynamische Grundlage der Lorentzschen Theorie der Elektrodynamik bewegter Körper dem Relativitätsprinzip entspricht.

Es möge noch kurz bemerkt werden, daß aus den entwickelten Gleichungen leicht der folgende wichtige Satz gefolgert werden kann: Bewegt sich ein elektrisch geladener Körper beliebig im Raume und ändert sich hierbei seine Ladung nicht, von einem mit dem Körper bewegten Koordinatensystem aus betrachtet, so bleibt seine Ladung auch — von dem „ruhenden" System K aus betrachtet — konstant.

§ 10. Dynamik des (langsam beschleunigten) Elektrons.

In einem elektromagnetischen Felde bewege sich ein punktförmiges, mit einer elektrischen Ladung ε versehenes Teilchen (im folgenden „Elektron" genannt), über dessen Bewegungsgesetz wir nur folgendes annehmen:

Ruht das Elektron in einer bestimmten Epoche, so erfolgt in dem nächsten Zeitteilchen die Bewegung des Elektrons nach den Gleichungen

$$\mu \frac{d^2x}{dt^2} = \varepsilon X$$

$$\mu \frac{d^2y}{dt^2} = \varepsilon Y$$

$$\mu \frac{d^2z}{dt^2} = \varepsilon Z,$$

wobei x, y, z die Koordinaten des Elektrons, μ die Masse des Elektrons bedeutet, sofern dasselbe langsam bewegt ist.

Es besitze nun zweitens das Elektron in einer gewissen Zeitepoche die Geschwindigkeit v. Wir suchen das Gesetz, nach welchem sich das Elektron im unmittelbar darauf folgenden Zeitteilchen bewegt.

Ohne die Allgemeinheit der Betrachtung zu beeinflussen, können und wollen wir annehmen, daß das Elektron in dem Momente, wo wir es ins Auge fassen, sich im Koordinaten-

sprung befinde und sich längs der X-Achse des Systems K mit der Geschwindigkeit v bewege. Es ist dann einleuchtend, daß das Elektron im genannten Momente ($t = 0$) relativ zu einem längs der X-Achse mit der konstanten Geschwindigkeit v parallelbewegten Koordinatensystem k ruht.

Aus der oben gemachten Voraussetzung in Verbindung mit dem Relativitätsprinzip ist klar, daß sich das Elektron in der unmittelbar folgenden Zeit (für kleine Werte von t) vom System k aus betrachtet nach den Gleichungen bewegt:

$$\mu \frac{d^2 \xi}{d \tau^2} = \varepsilon X',$$

$$\mu \frac{d^2 \eta}{d \tau^2} = \varepsilon Y',$$

$$\mu \frac{d^2 \zeta}{d \tau^2} = \varepsilon Z',$$

wobei die Zeichen ξ, η, ζ, τ, X', Y', Z' sich auf das System k beziehen. Setzen wir noch fest, daß für $t = x = y = z = 0$ $\tau = \xi = \eta = \zeta = 0$ sein soll, so gelten die Transformationsgleichungen der §§ 3 und 6, so daß gilt:

$$\tau = \beta \left(t - \frac{v}{V^2} x \right),$$

$$\xi = \beta (x - v t), \qquad X' = X,$$

$$\eta = y, \qquad Y' = \beta \left(Y - \frac{v}{V} N \right),$$

$$\zeta = z, \qquad Z' = \beta \left(Z + \frac{v}{V} M \right).$$

Mit Hilfe dieser Gleichungen transformieren wir die obigen Bewegungsgleichungen vom System k auf das System K und erhalten:

$$\text{(A)} \qquad \begin{cases} \dfrac{d^2 x}{d t^2} = \dfrac{\varepsilon}{\mu} \dfrac{1}{\beta^3} X, \\ \dfrac{d^2 y}{d t^2} = \dfrac{\varepsilon}{\mu} \dfrac{1}{\beta} \left(Y - \dfrac{v}{V} N \right), \\ \dfrac{d^2 z}{d t^2} = \dfrac{\varepsilon}{\mu} \dfrac{1}{\beta} \left(Z + \dfrac{v}{V} M \right). \end{cases}$$

Wir fragen nun in Anlehnung an die übliche Betrachtungsweise nach der „longitudinalen“ und „transversalen“ Masse

des bewegten Elektrons. Wir schreiben die Gleichungen (A) in der Form

$$\mu\beta^3\frac{d^2x}{dt^2} = \varepsilon X = \varepsilon X',$$

$$\mu\beta^2\frac{d^2y}{dt^2} = \varepsilon\beta\left(Y - \frac{v}{V}N\right) = \varepsilon Y',$$

$$\mu\beta^2\frac{d^2z}{dt^2} = \varepsilon\beta\left(Z + \frac{v}{V}M\right) = \varepsilon Z'$$

und bemerken zunächst, daß $\varepsilon X'$, $\varepsilon Y'$, $\varepsilon Z'$ die Komponenten der auf das Elektron wirkenden ponderomotorischen Kraft sind, und zwar in einem in diesem Moment mit dem Elektron mit gleicher Geschwindigkeit wie dieses bewegten System betrachtet. (Diese Kraft könnte beispielsweise mit einer im letzten System ruhenden Federwage gemessen werden.) Wenn wir nun diese Kraft schlechtweg „die auf das Elektron wirkende Kraft" nennen und die Gleichung

$$\text{Massenzahl} \times \text{Beschleunigungszahl} = \text{Kraftzahl}$$

aufrechterhalten, und wenn wir ferner festsetzen, daß die Beschleunigungen im ruhenden System K gemessen werden sollen, so erhalten wir aus obigen Gleichungen:

$$\text{Longitudinale Masse} = \frac{\mu}{\left(\sqrt{1 - \left(\frac{v}{V}\right)^2}\right)^3},$$

$$\text{Transversale Masse} = \frac{\mu}{1 - \left(\frac{v}{V}\right)^2}.$$

Natürlich würde man bei anderer Definition der Kraft und der Beschleunigung andere Zahlen für die Massen erhalten; man ersieht daraus, daß man bei der Vergleichung verschiedener Theorien der Bewegung des Elektrons sehr vorsichtig verfahren muß.

Wir bemerken, daß diese Resultate über die Masse auch für die ponderabeln materiellen Punkte gilt; denn ein ponderabler materieller Punkt kann durch Zufügen einer *beliebig kleinen* elektrischen Ladung zu einem Elektron (in unserem Sinne) gemacht werden.

Wir bestimmen die kinetische Energie des Elektrons. Bewegt sich ein Elektron vom Koordinatenursprung des Systems K aus mit der Anfangsgeschwindigkeit 0 beständig auf der

X-Achse unter der Wirkung einer elektrostatischen Kraft X, so ist klar, daß die dem elektrostatischen Felde entzogene Energie den Wert $\int \varepsilon X dx$ hat. Da das Elektron langsam beschleunigt sein soll und infolgedessen keine Energie in Form von Strahlung abgeben möge, so muß die dem elektrostatischen Felde entzogene Energie gleich der Bewegungsenergie W des Elektrons gesetzt werden. Man erhält daher, indem man beachtet, daß während des ganzen betrachteten Bewegungsvorganges die erste der Gleichungen (A) gilt:

$$W = \int \varepsilon X dx = \int_0^v \beta^3 v dv = \mu V^2 \left\{ \frac{1}{\sqrt{1 - \left(\frac{v}{V}\right)^2}} - 1 \right\}.$$

W wird also für $v = V$ unendlich groß. Überlichtgeschwindigkeiten haben — wie bei unseren früheren Resultaten — keine Existenzmöglichkeit.

Auch dieser Ausdruck für die kinetische Energie muß dem oben angeführten Argument zufolge ebenso für ponderable Massen gelten.

Wir wollen nun die aus dem Gleichungssystem (A) resultierenden, dem Experimente zugänglichen Eigenschaften der Bewegung des Elektrons aufzählen.

1. Aus der zweiten Gleichung des Systems (A) folgt, daß eine elektrische Kraft Y und eine magnetische Kraft N dann gleich stark ablenkend wirken auf ein mit der Geschwindigkeit v bewegtes Elektron, wenn $Y = N . v/V$. Man ersieht also, daß die Ermittelung der Geschwindigkeit des Elektrons aus dem Verhältnis der magnetischen Ablenkbarkeit A_m und der elektrischen Ablenkbarkeit A_e nach unserer Theorie für beliebige Geschwindigkeiten möglich ist durch Anwendung des Gesetzes:

$$\frac{A_m}{A_e} = \frac{v}{V}.$$

Diese Beziehung ist der Prüfung durch das Experiment zugänglich, da die Geschwindigkeit des Elektrons auch direkt, z. B. mittels rasch oszillierender elektrischer und magnetischer Felder, gemessen werden kann.

2. Aus der Ableitung für die kinetische Energie des Elektrons folgt, daß zwischen der durchlaufenen Potential-

differenz und der erlangten Geschwindigkeit v des Elektrons die Beziehung gelten muß:

$$P = \int X\,dx = \frac{\mu}{\varepsilon} V^2 \left\{ \frac{1}{\sqrt{1 - \left(\frac{v}{V}\right)^2}} - 1 \right\}.$$

3. Wir berechnen den Krümmungsradius R der Bahn, wenn eine senkrecht zur Geschwindigkeit des Elektrons wirkende magnetische Kraft N (als einzige ablenkende Kraft) vorhanden ist. Aus der zweiten der Gleichungen (A) erhalten wir:

$$-\frac{d^2y}{dt^2} = \frac{v^2}{R} = \frac{\varepsilon}{\mu}\frac{v}{V} N \cdot \sqrt{1 - \left(\frac{v}{V}\right)^2}$$

oder

$$R = V^2 \frac{\mu}{\varepsilon} \cdot \frac{\frac{v}{V}}{\sqrt{1 - \left(\frac{v}{V}\right)^2}} \cdot \frac{1}{N}.$$

Diese drei Beziehungen sind ein vollständiger Ausdruck für die Gesetze, nach denen sich gemäß vorliegender Theorie das Elektron bewegen muß.

Zum Schlusse bemerke ich, daß mir beim Arbeiten an dem hier behandelten Probleme mein Freund und Kollege M. Besso treu zur Seite stand und daß ich demselben manche wertvolle Anregung verdanke.

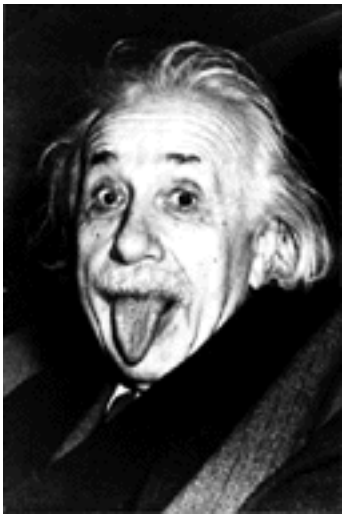
Bern, Juni 1905.

(Eingegangen 30. Juni 1905.)

I FOUND

Einstein's Brain

A true story. It was 1978, and I was working for a regional magazine called New Jersey Monthly. It was located in Princeton. My editor told me to go find Einstein's brain. It seems that he had read the Ronald Clark biography of Einstein and got to the part (towards the end, of course) where it says Einstein's body was cremated, except for the brain which was kept for scientific study. Einstein had died in 1955--twenty two years before--and no one had heard squat about it since. My editor had tried to check up on it, even contacting the Einstein estate, but hadn't been about to find out anything about it. So he told me do it.



In short, I did. To make a longish story short (the story was published in the August 1978 edition of the magazine), I came to the conclusion that the brain, in sectioned form, was still in the possession of the pathologist who removed it from the Einstein head, Dr. Thomas Harvey. I tracked him down in Wichita, Kansas. At first he didn't want to tell me anything, but after a while he finally admitted that he had the brain. After a longer while, he sheepishly told me it was IN THE VERY OFFICE WE WERE SITTING IN. He walked to a box labeled "Costa Cider" and pulled out two big Mason jars. In those were the remains of the brain that changed the world.

Forgive me, but it was almost a religious experience.

After the article came out, the media went a little bonkers. They camped out on poor Dr. Harvey's lawn, and made life unpleasant for him. I did radio interviews for two solid days. Johnny Carson made a joke about it. My friends told me it would be the high point in my career. (Were they right? You decide.)

Oh, and Dr. Harvey told me that so far he had found nothing to indicate the physical nature of this particular brain was anything special. But some scientists in California heard about the brain from my story and eventually did some work which showed some anomalies. Anyway, the big excitement for me was seeing those little brain-pieces, each the size of a Goldenberg's peanut chew, bobbing up and down in solution. This changed everything.

Steven Levy

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