

The following is by no means a comprehensive study of “radiant energy” because so many people worked with it beginning in 1816 and continuing to today. It does show the origins of the term and some of the work Tesla and others did with it. You will find that to say Tesla discovered radiant energy would be like saying Galileo discovered the stars.

The following is from a lecture delivered before the Institution of Electrical Engineers in London during February of 1892 titled *Experiments with Alternate Currents of High Potential and High Frequency*.

“...but one [name], at least, I must mention – a name which could not be omitted in a demonstration of this kind. It is a name associated with the most beautiful invention ever made: it is Crookes!

When I was at college, a good while ago, I read, in translation (for then I was not familiar with your magnificent language), the description of his experiments on radiant matter.”

What is this book? *On radiant matter** by Sir William Crookes. At the end of the lecture in 1879 Crookes uses the term “radiant energy”. Tesla attended various schools from 1870 to 1880 so it was probably 1880 that he read the book, the lecture which it contains being presented August 22, 1879.

<http://www.teslauniverse.com/nikola-tesla-timeline-1856-birth-of-tesla> - Tesla timeline

An interesting note on Crookes’ lecture is that he references a lecture given by Michael Faraday in 1816 titled *On Radiant Matter* and another by Faraday given in 1819 to City Philosophical Society titled *On the Forms of Matter*. In the latter, Faraday proposes a new fourth state of matter (solid, liquid, and gas being the accepted three at the time) to be known as radiant matter. While acknowledging that it is not proven to exist, he extends justifications for it to be accepted. Over 100 years later radiant matter is to become known as “plasma”. It was in 1928 that Irving Langmuir coins the term plasma as related to radiant matter.

<https://archive.org/details/OnRadiantMatter> - Crookes’ lecture

<https://archive.org/details/lifelettersoffar01joneuoft> - The Life and Letters of Michael Faraday

<http://www.universetoday.com/84361/plasma/> - Langmuir

What is the device that Tesla calls “the most beautiful invention ever made”? The radiometer (1873) or the Crookes Tube (1879)?

“[The radiometer] was invented in 1873 by the chemist Sir William Crookes as the by-product of some chemical research. In the course of very accurate quantitative chemical work, he was weighing samples in a partially evacuated chamber to reduce the effect of air currents, and noticed the weighings were disturbed when sunlight shone on the balance. Investigating this effect, he created the device named after him.”

http://en.wikipedia.org/wiki/Crookes_radiometer - Crookes Radiometer

Today it is accepted that the vanes in the Crookes Radiometer turn due to heat rather than light rays impacting the vanes. That is of little importance to this chronology because at the time it was thought that the motion was caused by radiant matter.

Further experiments led to Crookes developing the Crookes tube which is a modification of the earlier Geissler tube invented in 1857 by Heinrich Geissler which was the first gas-discharge lamp that caused fluorescence of matter in the bulb by electrification. We know Geissler tubes today as neon tubes. Crookes and others used modified versions of Geissler tubes to further study cathode rays.

http://en.wikipedia.org/wiki/Geissler_tube - Geissler Tube

http://en.wikipedia.org/wiki/Crookes_tube - Crookes Tube

In 1888 Philipp Lenard began studying cathode rays using modified Crookes tubes. He used the aluminum “Lenard windows” of his tubes to confirm some of J. J. Thomson’s work that showed cathode rays are negatively charged energetic particles rather than electromagnetic waves.

http://www.nobelprize.org/nobel_prizes/physics/laureates/1905/lenard-bio.html - Philipp Lenard

Sidebar: At the time aluminum was more expensive than gold and silver because of the difficulty of isolating it from its ore. What eventually made aluminum as cheap as it is today was Tesla’s alternating current and the development of the induction furnace using AC electricity.

<http://www.aluminum.org/aluminum-advantage/history-aluminum> - History of aluminum

http://en.wikipedia.org/wiki/Induction_furnace - Induction furnace

In 1895 Wilhelm Roentgen discovers the X-ray using modified Crookes and Lenard tubes, the X being taken from mathematics where it designates an unknown value, meaning an unknown cathode ray.

http://en.wikipedia.org/wiki/Wilhelm_R%C3%B6ntgen - Wilhelm Roentgen

Thomson showed in 1897 that the cathode rays could be deflected by an electrical field as well as a magnetic field.

It’s interesting to note here that Thomson called the particles at the heart of the cathode rays corpuscles, Lenard called them quanta, and later they became known as electrons.

<http://en.wikipedia.org/wiki/Electron#Discovery> - History of the Electron

To understand the significance of studying cathode rays we must understand that at the time the investigations were occurring the atom was considered the absolute minima of matter – there were no subatomic particles and, in the mind of the scientists of the day, there could be no subatomic particles. These investigations led to the realization that the cathode rays were particles of matter smaller than atoms traveling in straight lines at very high velocities in the tubes, that the trajectory of the particles could be manipulated by magnetic and electrical fields, and that the particles could pass through the wall of the tube without breaking it. The very notion of subatomic particles overthrew the idea that the atom was the absolute minima of matter, a very fundamental change in physics.

Not only were the particles subatomic but they carried an electrical charge and could be manipulated with electromagnetic fields. And their charge existed both inside and outside the vacuum tubes, i.e. wireless transmission of electrical charge.

I have been unable to locate any direct reference to Tesla using the term “stinging rays”. His March, 11, 1896 *On Roentgen Rays* article in *Electrical Review* does, however, contain the following: “It may not be known that even an ordinary streamer, breaking out suddenly and under great pressure from the terminal of a disruptive coil, passes through a thick glass plate as though the latter were not present. Unquestionably, with such coils pressures are practicable which will, project the particles in straight lines even under atmospheric pressure. I have obtained distinct impressions in free air, not by streamers, as some experimenters have done, using static machines or induction coils, but by actual projection, the formation of streamers being absolutely prevented by

careful static screening.” This may relate to the “stinging rays” as it is often stated that he felt the stinging through both glass and copper plates between himself and the radiant energy source.

<http://www.teslauniverse.com/nikola-tesla-article-on-roentgen-rays> – On Roentgen Rays – March 11, 1896

In the April 22, 1896 Electrical Review, Tesla’s article *Tesla’s latest Roentgen Ray Investigations* he states “...streams resembling the cathodic must be emitted by the sun and probably also by other sources of radiant energy, such as an arc light or Bunsen burner.” This is the earliest use I found of Tesla’s use of the term “radiant energy” though there may be earlier usages. Note that he references both natural and artificial sources.

<http://www.teslauniverse.com/nikola-tesla-article-teslas-latest-roentgen-ray-investigations> - Roentgen Ray Investigations

Referring again to the stinging rays, Tesla warns about problems of being exposed to cathode rays. He describes various discomforts encountered when experimenting with cathode rays at high power including tingling sensations and burns on flesh in his article in Electrical Review of May 5, 1897 titled *On Hurtful Actions of Lenard and Roentgen Tubes*. This is critical information for anyone experimenting with radiant energy.

<http://www.teslauniverse.com/nikola-tesla-article-on-hurtful-actions-of-lenard-and-roentgen-tubes> - Hurtful Actions

Sidebar: A link to Tesla and “cold electricity” can be found in the *On Roentgen Rays* article of March 11, 1896 in Electrical Review: “After some time the reddish light subsides, the streams becoming again white, whereupon they get weaker and weaker, wavering around the electrode until they finally disappear: Meanwhile, the phosphorescence of the glass grows more and more intense, and the spot where the stream strikes the wall becomes very hot, while the phosphorescence around the electrode ceases and the latter cools down to such an extent that the glass near it may be actually ice cold to the touch. The gas in the bulb has then reached the required degree of rarefaction.”

There are references to some frightful experiences in the above articles when considered today with what we now know about X-rays and human biology. “An outline of the skull is easily obtained with an exposure of 20 to 40 minutes. In one instance an exposure of 40 minutes gave clearly not only the outline, but the cavity of the eye, the chin and cheek and nasal bones, the lower jaw and connections to the upper one, the vertebral column and connections to the skull, the flesh and even the hair. By exposing the head to a powerful radiation strange effects have been noted. For instance, I find that there is a tendency to sleep and the time seems to pass away quickly.” Brain wave modification? Another: “At times it has seemed to me as though I myself heard a whispering voice, and I have searched eagerly among my dusty bulbs and bottles. I fear my imagination has deceived me, but there they are still, my dusty bulbs, and I am still listening hopefully.” Aural hallucination? Could these and other of his high frequency high voltage experiments be the cause of his obsessive compulsive disorder? This from Tesla’s 1916 Pre-Hearing Interview, “A common experiment, for instance, in my laboratory on Houston Street, was to pass through a coil energy at a rate of several thousand horsepower, put a piece of thick tinfoil on a stick, and approach it to that coil. The tinfoil would melt, and would not only melt, but while it was still in that form, it would be evaporated and the whole process took place in so small an interval of time that it was like a cannon shot. Instantly I put it there, there was an explosion. That was a striking experiment. It simply showed the power of the condenser, and at that time I was so reckless that in order to demonstrate to my visitors that my theories were correct, I would stick my head into that coil and I was not hurt; but, I would not do it now.”

We must note that the foregoing descriptions of the experiments with cathode rays all required an external power source of high voltage and high frequency to excite the cathode to produce the rays.

Tesla's radiant energy patents

Nikola Tesla filed his application for patent titled *Apparatus for the Utilization of Radiant Energy* on March 21, 1901 and the patent was granted November 5, 1901 under patent number 685,957. Some quotes from that patent are instructive regarding radiant energy. Highlights are added by me.

[http://www.teslauniverse.com/nikola-tesla-patents-685,957-utilization-of-radiant-energy?pq=Njg1OTU3-Apparatus for the Utilization of Radiant Energy](http://www.teslauniverse.com/nikola-tesla-patents-685,957-utilization-of-radiant-energy?pq=Njg1OTU3-Apparatus+for+the+Utilization+of+Radiant+Energy)

“It is well known that certain radiations – such as those of ultra-violet light, cathodic, Roentgen rays, or the like – possess the property of charging and discharging conductors of electricity...”

“My own experiments and observations, however, lead me to conclusions more in accord with the theory heretofore advanced by me that sources of such radiant energy throw off with great velocity minute particles of matter that are strongly electrified, and therefore capable of charging an electrical conductor...”

“My present application is based upon a discovery which I have made that when rays or radiations of the above kind are permitted to fall upon an insulated conducting-body connected to one of the terminals of a condenser while the other terminal of the same is made by independent means to receive or to carry away electricity a current flows into the condenser so long as the insulated body is exposed to the rays, and under the conditions hereinafter specified an indefinite accumulation of electrical energy in the condenser takes place. This energy after a suitable time interval, during which the rays are allowed to act, may manifest itself in a powerful discharge...”

“It is very important, particularly in view of the fact that electrical energy is generally supplied at a very slow rate to the condenser, to construct the same with the greatest care.”

“The insulated plate or conducting-body should present as large a surface as practicable to the rays or streams of matter, I having ascertained that the amount of energy conveyed to it per unit of time is under otherwise identical conditions proportionate to the area exposed, or nearly so.”

The reason I highlighted the statements about time, above, is that we must realize that we cannot extract energy from such a device faster than it is accumulated and it is accumulated slowly depending on the size of the insulated, elevated plate and the quality of the capacitor.

“Furthermore, the surface should be clean and preferably highly polished or amalgamated.”

Amalgamated, in terms of metallurgy, means to mix or alloy a metal with mercury. Why mercury? “Mercury arc rectifiers (also known as *Cooper-Hewitt* or *Hewittic* rectifiers) were extensively used to provide DC in high power applications, powers ranging from kilowatts up to a few megawatts, at voltages ranging from 110V to 30KV. Their operation is based on the discovery that an arc between a pool of mercury and a metal anode only allows current to pass in one direction.”

Many of Tesla's patented circuit controllers used a pool of mercury and we can now see why – unidirectional current flow.

<http://www.electricstuff.co.uk/mercarc.html> - Mercury Arc Rectifiers

<http://www.teslauniverse.com/nikola-tesla-patents-609,245-electrical-circuit-controller?pq=bWVyY3VyeQ==>

<http://www.teslauniverse.com/nikola-tesla-patents-609,246-electric-circuit-controller?pq=bWVyY3VyeQ==>

<http://www.teslauniverse.com/nikola-tesla-patents-609,248-electric-circuit-controller?pq=bWVyY3VyeQ==>

<http://www.teslauniverse.com/nikola-tesla-patents-609,249-electric-circuit-controller?pq=bWVyY3VyeQ==>

<http://www.teslauniverse.com/nikola-tesla-patents-609,251-electric-circuit-controller?pq=bWVyY3VyeQ==>

<http://www.teslauniverse.com/nikola-tesla-patents-611,719-electrical-circuit-controller?pq=bWVyY3VyeQ==>

<http://www.teslauniverse.com/nikola-tesla-patents-613,735-electric-circuit-controller?pq=bWVyY3VyeQ==>

“Fig. 3 shows a modified form of apparatus used in connection with an artificial source of radiant energy, which in this instance may be an arc emitting copiously ultra-violet rays. A suitable reflector may be provided for concentrating and directing the radiations.”

“Still another modification is shown in Fig. 4, in which the source S of radiant energy is a special form of Roentgen tube devised by me, having one terminal *k*, generally of aluminum, in the form of half a sphere, with a plain polished surface on the front side, from which the streams are thrown off. It may be excited by attaching it to one of the terminals of any generator of sufficiently high electromotive force; but whatever apparatus be used it is important that the tube be exhausted to a high degree, as otherwise it might prove entirely ineffective.”

Nikola Tesla filed his application for patent titled *Method of Utilizing of Radiant Energy* on March 21, 1901 and the patent was granted November 5, 1901 under patent number 685,958. This patent has the same application and granting dates as the patent for the apparatus above. This patent and the one above are substantially the same but there is some information in this one not covered in the above patent.

“The rays or radiations which are to be utilized for the operation of the apparatus above described in general terms may be derived from a natural source, as the sun, or may be artificially produced by such means, for example, as an arc-lamp, a Roentgen tube, and the like, and they may be employed for a great variety of useful purposes.”

“The source S may be any form of Roentgen or Lenard tube...”

<http://www.teslauniverse.com/nikola-tesla-patents-685,958-utilizing-radiant-energy?pq=Njg1LDk1OA==> -

Method of utilizing Radiant Energy

Part of what is interesting about these patents is the application dates which are after he returned from Colorado Springs. While his work there was generally about wireless transmission of power through the atmosphere between balloons maintained at altitudes of 30,000 feet, he witnessed thunderstorms and their attendant lightning on July 4, 1899 that made an impression on him. The entry in his notes about the experience ends with the note “This is important!”

<http://www.teslauniverse.com/nikola-tesla-patents-645,576-transmission-of-energy?pq=NjQ1LDU3Ng==> -

30,000 feet

<http://www.bibliotecapleyades.net/tesla/coloradonotes/coloradonotes.htm> - Colorado Springs Notes

The July 4, 1899 notes are well worth a read in regard to radiant energy because lightning is a form of radiant energy and we now know that sufficiently strong lightning emits X-rays and gamma rays. I personally witnessed the emissions from lightning intensifying the charge on a radiant energy collector from which I was

reading the voltage when the lightning occurred some miles away. The voltage reading immediately jumped to four times what it was and then over about 10 seconds returned to its previous level. This also emphasizes one of the reasons the elevated plate is insulated – to prevent it from ionizing the air around the plate like a Franklin lightning rod which actually attracts lightning.

<http://www.teslauniverse.com/nikola-tesla-patents-1,266,175-lightning-protector?pq=MTI2NjE3NQ==> -

Lightning Protector

Sidebar: In his notes the following day, July 5, 1899, there is a note about the balloons. So at that point Tesla was still considering transmission between balloons maintained at altitude. I believe that on reflection after his return from Colorado Springs he realized that he could transmit power through the crust of the earth and didn't need the balloons because he never attempted to transmit between balloons. There would surely be photos if he had but there are no photographs and Wardenclyffe had no such facility. He did, however, do a demonstration for a patent examiner through a long tube in his laboratory that had been partially evacuated to simulate the air density at high altitudes. There is a drawing of the device in the Preface of the above link to the Colorado Springs Notes. The reason I make note of his transmission plans here is that, although the transmission could be accomplished with whatever source of electricity generation was available, it has the same general principal as the rays transmitting energy wirelessly. His Wardenclyffe project did not use radiant energy but a steam powered generator. Considering that Tesla was planning to transmit power between balloons at 30,000 feet it raises the question of whether he was planning on placing the insulated elevated plate of the radiant energy collector at some similar altitude. With the advent of air travel we discovered the higher radiation exposure at higher altitudes. He does not, however, mention this anywhere that I found.

Radioactive Matter

In 1896 Henri Becquerel discovered that uranium salts emitted rays that resembled the cathode rays discovered by Roentgen in 1895 in their penetrating power. He demonstrated that this radiation did not depend on an external source of energy but seemed to arise spontaneously from the uranium itself.

http://en.wikipedia.org/wiki/Henri_Becquerel - Henri Becquerel

So here we have a natural source of radiating particles carrying an electrical charge that does not require an artificially generated stimulation to cause the emission of the charged particle.

Learning of Becquerel's work, Marie Curie decided to study the rays emitted by uranium salts for a thesis. Her husband Pierre and his brother had previously developed a device to detect weak electrical charge. She used it to discover that the air around a sample of uranium salts was electrified and that the strength of the electrification was dependent only on the quantity of the sample. She hypothesized that the radiated electrification was not a result of molecular interactions but came from the atom itself. During her work she isolated polonium, thorium, and radium.

http://en.wikipedia.org/wiki/Marie_Curie - Marie Curie

Ernest Rutherford worked on the conductive effects of X-rays with J. J. Thomson and, hearing of Henri Becquerel's work on uranium, experimented with radioactivity and discovered two different types with energy levels that he called alpha rays and beta rays in 1899. In 1903 he worked with a type of radiation discovered but unnamed by Paul Villard and called it gamma rays. The three terms are still used today for alpha, beta, and gamma radiation. In following years he worked with a who's who of scientists in the nuclear field including

Hans Geiger, Thomas Royds, Ernest Marsten, Niels Bohr, and James Chadwick and was responsible for the developing the theory of the structure of the atom which James Chadwick is credited with proving in 1932.

http://en.wikipedia.org/wiki/Ernest_Rutherford – Earnest Rutherford

http://en.wikipedia.org/wiki/James_Chadwick - James Chadwick

There was an overlapping of time when Tesla was studying radiant energy from the macrocosm (he mentions the sun and cosmic rays regularly) and others were studying radiant energy from the microcosm of the atom. They are essentially the same thing – charged particles traveling in straight lines, or “rays”, that can move electrical charge from one place to another – wireless transmission of energy. Tesla confirms this with his position in an *Electrical World and Engineer* article of January 7, 1905: “I have noted with satisfaction the first signs of a change of scientific opinion. The brilliant discovery of the exceptionally ‘radio-active’ substance, radium and polonium, by Mrs. Sklodowska Curie, has likewise afforded me much personal gratification, being [a resounding] confirmation of my early experimental demonstrations, of electrified radiant streams of primary matter or corpuscular emanations (*Electrical Review*, New York, 1896-1897), which were then received with incredulity.”

<http://www.scribd.com/doc/251078268/Tesla-Said-Compiled-by-John-Ratzlaff#scribd> – “Tesla Said”

<http://teslacollection.com/> - Searchable collection of articles about Tesla’s work which can be searched by date to find the articles related to the 1896-1897 time period.

While others were using the rays to create images, Tesla was capturing and using that transmitted charge in his patented electrical devices. With the exceptions of Geissler, Crookes, Becquerel, and Tesla the above mentioned people were academics. Geissler focused on what we today call neon lamps, Crookes on fluorescence and imaging, and Becquerel on spontaneous radioactivity. It was Tesla who focused his energies on the electrical properties of their discoveries and developed devices and methods for utilizing the electrical charge of those particles. Tesla was able to translate their scientific discoveries into machines for utilization of their work to benefit mankind rather than just academia. That was Tesla’s genius.

Construction on the Wardenclyffe project began in 1901. Due to Tesla’s inability to raise funds to build the facility as originally envisioned he was required to scale the original plan down and encountered many problems in doing so which occupied much of his time.

http://en.wikipedia.org/wiki/Wardenclyffe_Tower - Wardenclyffe

In 1905 Dr. Tesla’s patents for alternating current motors and power distribution expired halting his royalty income from same and in 1906 the Wardenclyffe project was abandoned.

We don’t hear much from Tesla about radiant energy for some time thereafter. In 1909 he applies for a patent of his turbine. It is interesting to note that he says in the patent application that it is applicable to gases, fluids, and particles. He also notes that the device, with modifications, can be used as a pump or a motor.

<http://www.teslauniverse.com/nikola-tesla-patents-1,061,142-fluid-propulsion?pq=MSwwNjEsMTQy> – Fluid Propulsion

In 1917 Tesla moved to Chicago to work for the Pyle National Company and spent his time there perfecting his turbine.

In 1918 Tesla files for patent of his Lightning Protector which operates opposite of the Franklin pointed lightning rod by draining the adjacent atmosphere of charge to equalize charges between the ground and atmosphere to prevent a lightning strike as opposed to the Franklin pointed lightning rod which ionizes the air around the point and actually attracts lightning to the rod. There is an article on page 380 of the October 1918 issue of *Electrical Experimenter* about Tesla's Lightning Protector. It is interesting because it shows the device attracting charge from the atmosphere whereas the patent application does not show this feature. Unfortunately the illustrator for the article is not given.

<http://www.teslauniverse.com/nikola-tesla-patents-1,266,175-lightning-protector?pq=MTI2NjE3NQ==> -

Lightning Protector patent

http://teslacollection.com/tesla_articles/1918/electrical_experimenter/h_gernsback/tesla_has_new_pointless_lightning_rod - Electrical Experimenter article

In the November 1928 Popular Science magazine there is an article titled "A Prophet of Science Looks into the Future" by Alden P. Armagnac in which he interviews Tesla. That article contains the following: "And – more widely interesting in this day of radio – this strange, many-sided man clings to the opinion he expressed in his scientific investigations published from 1896-1898, that the source of all rays we know is always a stream of tangible particles or 'corpuscles,' rather than waves or vibrations. Even before the discovery of radium, Tesla expressed his belief that radioactive rays were of this sort, a view ridiculed at that time. When radium was discovered it was found actually to emit particles of matter – flying nuclei of helium atoms, called 'alpha' rays. Tesla has maintained ever since that radium is not a generator but a transformer of energy, the emanations being caused by cosmic rays of immense power capable of penetrating all obstacles however thick." The "capable of penetrating all obstacles however thick" relates to neutrinos.

<http://www.popsci.com/archive-viewer?id=tCcDAAAAMBAJ> – Popular Science article

In an article titled "Tesla, 75, Predicts New Power Source" in the July 5, 1931 New York Times Tesla states "The phenomena of radioactivity are not the result of forces within the radioactive substances but are caused by this ray emitted by the sun. If radium could be screened effectively against this ray it would cease to be radioactive." It matters little for this article whether or not this is true or not because it is what Tesla believed. I personally think there might be something to it because today the only explanation we get from modern science is that the radioactive material is unstable. Unstable? Why is it unstable? I've not yet seen an explanation for this instability. So what is it that triggers the radioactive decay?

"Neutrinos do not carry any electric charge, which means that they are not affected by the electromagnetic force that acts on charged particles, such as electrons and protons. Neutrinos are affected only by the weak subatomic force, which is of much shorter range than electromagnetism, and gravity, which is relatively weak on the subatomic scale. Therefore, a neutrino typically passes through normal matter unimpeded."

"Most neutrinos passing through the Earth emanate from the Sun. About 65 billion solar neutrinos per second pass through every square centimeter perpendicular to the direction of the Sun in the region of the Earth."

<http://en.wikipedia.org/wiki/Neutrino> - Neutrino

In the article "Tesla Cosmic Ray Motor May Transmit Power 'Round Earth" by John A. O'NEILL for the *Brooklyn Eagle* dated July 10, 1932 Tesla states, "The attractive feature of the cosmic rays is their constancy. They shower down on us throughout the whole 24 hours, and if a plant is developed to use their power it will not require devices for storing energy as would be necessary with devices using wind, tide or sunlight. All of my investigations seem to point to the conclusion that they are small particles, each carrying so small a charge that we are justified in calling them neutrons." I believe he was speaking of what we today call neutrinos. There

are billions of them passing through your body every second of every day. We don't notice them because they rarely interact with matter. That's not to say they never interact with matter and it seems probable, to me at least, they could be the thing that makes radioactive matter radioactive because it is unstable and this tiny amount of energy tips the balance and the radioactive matter ejects a particle.

In the same article Tesla said, "I have harnessed the cosmic rays and caused them to operate a motive device." Note the year is 1932. We have some documentation from an interview with Tesla's nephew, Peter Salvo, that Tesla developed an automobile with an electric motor that had an unexplained power source. The documentation is not good on these claims and it is unlikely to ever be clarified. So the following is speculation.

In the same article, above, Tesla states "The attractive feature of the cosmic rays is their constancy. They shower down on us throughout the whole 24 hours, and if a plant is developed to use their power it will not require devices for storing energy as would be necessary with devices using wind, tide or sunlight." The power source for the car was said to be capable of powering a home when not in use in the vehicle and it was said to have no battery.

In a New York Times article published on July 11, 1937 titled "Sending of Messages to Planets Predicted by Dr. Tesla On Birthday" is the following statement: "Reports of discoveries by which it will be possible to communicate with the planets and to produce radium in unlimited quantity for \$1 a pound were announced by Dr. Nikola Tesla yesterday at a luncheon on his eighty-first birthday at which he was honored with high orders from the Yugoslav and Czechoslovak Governments."

Why would the cost of producing radium be of concern to Tesla? To grasp the importance of one dollar per pound of radium we need to look at the radium reserves of the time. The following article is from The Sydney Morning Herald published on February 11, 1935 and titled "Price of Radium. Big Drop Expected." London Feb. 10.

"The 'Sunday Express' says: - 'By the development of sources of radium in the Great Bear Lake (Canada), which are believed to be sufficient to supply the whole Empire, it is expected that the value of radium will drop from £10,000 to £1,000 per gramme. The present world's stock is 600 grammes; London hospitals between them have three-quarters of an ounce (about 31 grammes) valued at £250,000.'"

<http://trove.nla.gov.au/ndp/del/article/17152322>

A British Pound in 1935 has the purchasing power of about £58 GBP today. So in 1935 the cost in today's money was £580,000 per gram and was expected to be reduced to £58,000 per gram. Dr. Tesla speaks of obtaining radium for \$1.00 per pound and there are roughly 450 grams in a pound so that would be \$0.0022 per gram at that time. Examine the following for a grasp of this. What Things Cost in 1935: Car, \$580; Gasoline, 19 cents/gal; House, \$6,300; Bread, 8 cents/loaf; Milk, 47 cents/gal; Postage Stamp, 3 cents; Stock Market, 144; Average Annual Salary, \$1,500.

<http://answers.google.com/answers/threadview/id/266660.html> - What Things Cost in 1935

Again, why would Tesla care about the cost of radium? Consider the possibility that Tesla developed what we know today as a radioisotope battery. It is called a battery but is not what we normally think of as a battery that would be used in a car because once assembled they can supply power for up to 40 years. So they are a primary battery (non-rechargeable) but with a very, very long life. I propose that Tesla's 1931 Pierce-Arrow was powered by such a device. And the statement that it could power a home when not in use for transportation fits this idea also.

On page 13 of the PDF document at the following link is shown a diagram of an early 1950's radioisotope battery. It is, essentially, a Tesla radiant energy collector. The source is Sr-90 which would take the place of the Roentgen or Lenard tube in his patent, the dielectric is the insulation around the elevated plate, and the collector is the elevated plate. The page states the voltage is high – 7kV.

<http://homepages.cae.wisc.edu/~blanchar/res/BlanchardKorea.pdf> - Radioisotope batteries

It is necessary here, again, to understand history. There were absolutely no government controls whatsoever on radioactive materials until after it was proven that they could be weaponized by the use of atomic bombs in Japan. It wasn't until the 1950's that governments started imposing controls. So in the 1932 to 1937 time frame there would be no government involvement or prohibition against using radioactive materials in an energy generator.

<http://www.orau.org/ptp/PTP%20Library/library/DOT/miscellaneous/ramreview.pdf> - Radioactive Material Regulations History

Radioisotope batteries are in use today. The two Voyager spacecraft which are just now exiting the solar system into interstellar space use a variation known as a radioisotope thermoelectric generator for both power and heat. Its primary output is heat and thermocouples convert some of the heat to electricity. Their distance from the sun makes solar arrays useless and service is out of the question. They were launched in 1977 and are expected to have enough power to transmit data through 2020 and possibly 2025. Radioisotope batteries were also used in the Pioneer 10, Pioneer 11, Galileo, Ulysses, Cassini, New Horizons and the Mars Science Laboratory. RTGs were used to power the two Viking landers and for the scientific experiments left on the moon by the crews of Apollo 12 through 17.

http://en.wikipedia.org/wiki/Radioisotope_thermoelectric_generator - RTG

http://voyager.jpl.nasa.gov/multimedia/flash_html.html - Voyager

<http://www.nytimes.com/1989/08/26/us/voyager-s-heartbeat-is-nuclear-battery.html> - Voyager

http://en.wikipedia.org/wiki/Atomic_battery - Atomic battery

The powers that be have created an aversion to anything related to "radiation". Yet today we are exposed to radiation on a daily basis: natural background radiation; medical X-rays; some smoke detectors use Americium; elevated radiation exposure at high altitudes while flying; non-electrically powered emergency lights in stairwells of buildings, etc.

<http://en.wikipedia.org/wiki/Americium> - Americium

http://en.wikipedia.org/wiki/Magnetohydrodynamic_generator - MHD generator

http://en.wikipedia.org/wiki/Tritium_illumination - Tritium light

<http://depletedcranium.com/my-attempt-to-import-tritium-key-chains/> - U.S. import regulations

In fact, the antipathy toward any form of radiation is not well founded for low level radiation. The radiation exposure guidelines that are in place today were developed from the effects seen after atomic bombs were detonated in a linear fashion. There is, however, a known threshold under which no ill effects occur but the exposure guidelines ignore this threshold. It was known at the time the standards were developed but it was ignored: 'The first of Calabrese's recent articles is a straightforward history of the LNT [linear no threshold] model for ionizing radiation mutation, a concept accepted by radiation geneticists in the 1950s and recommended by national and international advisory committees for risk assessment and human exposure

guidelines and later generalized to chemical carcinogens ever since. It is now used by public health and regulatory agencies worldwide, he notes.

In the second of the two articles, Calabrese repeats his earlier accusations that the distinguished radiation geneticist Hermann Muller, in his acceptance speech for the 1946 Nobel Prize, "made deceptive statements" intended to "promote the acceptance of the linear dose-response model for risk assessment for ionizing radiation" and that Muller's advocacy agenda was "masked" by long-time colleague Curt Stern. Their actions affected "key publications in the mutation literature," enhancing acceptance of the linear dose-response and hiding "Muller's deceptions," Calabrese adds.'

<http://www.sciencedaily.com/releases/2013/08/130813201434.htm> - NAS misleads the world

<http://en.wikipedia.org/wiki/Maser> - Microwave Amplification by Stimulated Emission of Radiation

[http://en.wikipedia.org/wiki/Coherence_\(physics\)](http://en.wikipedia.org/wiki/Coherence_(physics)) – Coherence is obtained with a constant phase difference between two waves at the same frequency. It is an ideal property of waves that enables stationary (i.e. temporally and spatially constant) interference, i.e. constructive or destructive interference.